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# THE TRANSACTIONS

OF THE

# EDINBURGH OBSTETRICAL SOCIETY.

VOL. XVIII.

SESSION 1892-93.

EDINBURGH: OLIVER AND BOYD,
PUBLISHERS TO THE SOCIETY.
1893.

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# PREFACE.

THIS, the eighteenth volume of the Society's Transactions, contains a record of its proceedings during the Session 1892–93.

In it, as in former volumes, the views brought forward in the papers are to be considered as those of the writers themselves, and not as those of the Society as a body.

*October* 1893.

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## PRESIDENTS.

| | Year. | | Year. |
|---|---|---|---|
| Dr William Beilby, | 1840–41 | Dr Matthews Duncan, | 1874–75 |
| Sir James Y. Simpson, Bart., | 1842–57 | Professor A. R. Simpson, | 1876–77 |
| Dr John Moir, | 1858–59 | Dr David Wilson, | 1878–79 |
| Dr Alex. Keiller, | 1860–61 | Dr Angus Macdonald, | 1880–81 |
| Dr T. H. Pattison, | 1862–63 | Professor A. R. Simpson, | 1882–83 |
| Dr T. Graham Weir, | 1864–65 | Dr John Connel, | 1884–85 |
| Sir James Y. Simpson, Bart., | 1866–67 | Dr J. Halliday Croom, | 1886–87 |
| Dr John Burn, | 1868–69 | Dr C. E. Underhill, | 1888–89 |
| Dr Charles Bell, | 1870–71 | Dr D. Berry Hart, | 1890–91 |
| Dr L. R. Thomson, | 1872–73 | Professor A. R. Simpson, | 1892–93 |

## VICE-PRESIDENTS.

| | Year. | | Year. |
|---|---|---|---|
| Sir J. Y. Simpson, Bart., | 1840–41 | Dr J. A. Sidey, | 1868–69 |
| Dr Alex. Ziegler, | 1840–41 | Dr William Menzies, | 1870–71 |
| Dr J. Cowan, R.N., | 1842 | Dr L. R. Thomson, | 1870–71 |
| Dr Fairbairn, | 1842 | Professor A. R. Simpson, | 1872–73 |
| Dr Charles Ransford, | 1843 | Dr J. Matthews Duncan, | 1872–73 |
| Dr R. B. Malcolm, | 1843 | Dr Angus Macdonald, | 1874–75 |
| Dr Charles Bell, | 1844 | Dr R. Peel Ritchie, | 1874–75 |
| John Kennedy, Esq., | 1844 | Dr James Young, | 1876–77 |
| Dr John Moir, | 1845–47 | Dr Alex. Milne, | 1876–77 |
| Dr T. H. Pattison, | 1845–47 | Dr R. Peel Ritchie, | 1878–79 |
| Dr Beilby, | 1848 | Dr Angus Macdonald, | 1878–79 |
| Dr T. Graham Weir, | 1848 | Professor A. R. Simpson, | 1880–81 |
| Dr R. B. Malcolm, | 1849–53 | Dr Robert Bruce, | 1880–81 |
| Dr John Moir, | 1849–53 | Dr James Carmichael, | 1882–83 |
| Dr T. Graham Weir, | 1854–55 | Dr J. Halliday Croom, | 1882–83 |
| Dr John Moir, | 1854–55 | Dr Angus Macdonald, | 1884 |
| Dr W. Cumming, | 1856–57 | Dr Charles E. Underhill, | 1884–85 |
| Dr A. Thomson, | 1856–57 | Dr William Ziegler, | 1885 |
| Dr T. H. Pattison, | 1858–59 | Professor A. R. Simpson, | 1886–87 |
| Dr David Wilson, | 1858–59 | Dr Leith Napier, | 1886 |
| Dr T. Graham Weir, | 1860–61 | Dr D. Berry Hart, | 1887–88 |
| Dr George S. Keith, | 1860–61 | Dr James Foulis, | 1888–89 |
| Dr T. Graham Weir, | 1862–63 | Dr A. J. Sinclair, | 1889 |
| Dr Alex. Keiller, | 1862–63 | Professor A. R. Simpson, | 1890 |
| Dr T. H. Pattison, | 1864–65 | Dr Peter A. Young, | 1890–91 |
| W. S. Carmichael, Esq., | 1864–65 | Dr John Playfair, | 1891–92 |
| Dr John Burn, | 1866–67 | Dr Freeland Barbour, | 1892–93 |
| Dr Charles Bell, | 1866–67 | Dr A. Ballantyne, | 1893 |
| Dr William Bryce, | 1868–69 | | |

## TREASURERS.*

| | Year. | | Year. |
|---|---|---|---|
| Dr Ransford, | 1840 to 1842 | Dr J. A. Sidey, | 1859 to 1867 |
| Dr G. Paterson, | 1842 to 1847 | Dr James Young, | 1867 to 1875 |
| Dr Cumming, | 1847 to 1854 | Dr William Craig, | 1875 |
| Dr Keiller, | 1854 to 1859 | | |

* Previous to 1861 the office of Treasurer was conjoined with that of Senior Secretary.

## SECRETARIES.

| | Year. | | Year. |
|---|---|---|---|
| Dr Ransford, | 1840 to 1842 | Dr R. Peel Ritchie, | 1865 to 1873 |
| Dr G. Paterson, | 1840 to 1847 | Dr G. Stevenson Smith, | 1867 to 1871 |
| Dr Dunsmure, | 1842 to 1847 | Dr James Andrew, | 1871 to 1875 |
| Dr Cumming, | 1847 to 1854 | Dr Alexander Milne, | 1873 to 1875 |
| Dr Keith, | 1847 to 1849 | Dr C. E. Underhill, | 1875 to 1879 |
| Dr J. M. Duncan, | 1849 to 1852 | Dr James Carmichael, | 1875 to 1881 |
| Dr Keiller, | 1852 to 1859 | Dr D. Berry Hart, | 1879 to 1883 |
| Dr J. A. Sidey, | 1854 to 1861 | Dr A. H. Freeland Barbour, | 1881 to 1886 |
| Dr A. R. Simpson, | 1859 to 1865 | Dr R. Milne Murray, | 1883 to 1889 |
| Dr Peter Young, | 1861 to 1863 | Dr N. T. Brewis, | 1886 |
| Dr W. Stephenson, | 1863 to 1867 | Dr J. W. Ballantyne, | 1889 |

## LIBRARIANS.

| | Year. | | Year. |
|---|---|---|---|
| Dr J. Jamieson, | 1875 to 1879 | Dr Peter Young, | 1883 to 1889 |
| Dr C. E. Underhill, | 1879 to 1883 | Dr R. Milne Murray, | 1889 |

# LIST OF FELLOWS OF THE SOCIETY.

## HONORARY FELLOWS.

1890 Apostoli, Dr, 5 Rue Molière, Paris.

1882 Barnes, Dr Robert, Lingwood, Liss, Hants.

1882 Battey, Dr R., 36 Broad Street, Rome, Georgia.

1886 Bozeman, Dr Nathan, 296 Fifth Avenue, New York.

1891 Budin, Prof., 129 Boulevard St Germain, Paris.

1886 Chiara, Professor Domenico, Florence.

1882 Emmet, Dr, 93 Madison Avenue, New York.

1882 Freund, Professor, Kaiser Wilhelm's University, Strassburg.

1882 Goodell, Professor, 1418 Spruce St., Philadelphia.

1891 Gusserow, Prof., Charité, Berlin.

1891 Halbertsma, Professor, Utrecht.

1882 Hegar, Professor, Albert Ludwig's University, Freiburg.

1882 Hicks, Dr J. Braxton, 34 George St., Hanover Square, London, W.

1886 Keith, Dr Thomas, LL.D., 42 Charles Street, Berkeley Square, London, W.

1892 Kidd, Dr George H., 58 Merrion Square, Dublin.

1892 Koeberlé, Dr Eugene, Strassburg.

1890 Lusk, Dr W. T., 47 E. Thirty-fourth Street, New York.

1893 Moir, Dr John, 52 Castle Street.

1892 Müller, Dr Peter, Professor der Geburtshülfe, an der Universität, Berne, Switzerland.

1851 Oldham, Dr Henry, 4 Cavendish Place, London, W.

1889 Olshausen, Professor, Frauenklinik, Artillerie Strasse 13, Berlin.

1882 Pajot, Professor, Paris.

1882 Parvin, Professor, 1626 Spruce St., Philadelphia.

1892 Playfair, Professor Wm. S., LL.D., 31 George Street, Hanover Sq., London, W.

1882 Porro, Professor, Milan.

1882 Schultze, Professor B. S., University, Jena.

1892 Slavjansky, Professor R. J., Rue Liteinaia 24, St Petersburg.

1882 Spaeth, Professor, Vienna.

1882 Stadtfeldt, Professor, Copenhagen.

1864 Stolz, Professor, Nancy.

1890 Tait, Professor Lawson, LL.D., 7 The Crescent, Birmingham.

1882 Tarnier, Professor, Rue Duphot, Paris.

1882 Thomas, Professor T. G., 600 Madison Avenue, New York.

1882 Tibone, Professor, Turin.

1876 Turner, Professor Sir W., LL.D., 6 Eton Terrace, Edinburgh.

1887 Wells, Sir Spencer, M.D., 3 Upper Grosvenor Street, London, W.

1864 West, Dr Charles, care of E. Owen, Esq., Hospital for Sick Children, 49 Great Ormond Street, London, W.C.

1891 Wilson, Dr H. P. C., 146 Park Avenue, Baltimore, U.S.A.

1882 Winckel, Professor, Ludwig-Maximilian's University, Munich.

## CORRESPONDING FELLOWS.

1868 Aitchison, Dr James E. T., LL.D., Edinburgh.
1884 Arnott, Dr James, Bombay.

1863 Belgrave, Dr, Sydney.
1888 Bentley, Dr Arthur J., Cairo.
1880 Bosch, Dr Van Den, Liége.
1873 Boyd, Dr John, Slamannan.
1880 Brock, Dr W. J., Midlothian.
1863 Brown, Dr R. C., Preston.
1889 Brown, Surgeon Lt.-Col. D. Blair, A.M.D.

1859 Cayzer, Mr Thomas, Liverpool.
1858 Coghill, Dr J. G. S., Ventnor.

1869 Davies, Mr Thos., Whittlesea.
1873 Donovan, Mr W., Birmingham.

1877 Engelmann, Dr G., Kreuznach.

1859 Figg, Mr E. G., Edinburgh.
1864 Finlay, Dr R. B., Q.C., Lond.

1868 Grenser, Dr Paul W. T., Dresden.
1864 Grévé, Dr, Norway.
1875 Groesbeck, Dr Hermann J., New York.

1853 Hall, Dr D., Montreal.
1848 Hartmann, Dr, St Petersburg.
1870 Haynes, Dr Stanley, Malvern.
1880 Helme, Dr J. M., Rusholme.
1885 Helme, Dr T. A., Manchester.
1865 Henderson, Dr E., China.
1849 Higgins, Dr Chas. H., Birkenhead.
1866 Hubbard, Prof., Connecticut.
1887 Hume, Dr T., Surgeon-Major, India.
1882 Husband, Dr H. Aubrey, Manitoba.

1871 Johnston, Dr A. C., R.N., Edinburgh.
1882 Johnston, Surgeon-Major Wilson, India.

1845 Keith, Dr George S., Currie.
1867 Kingston, Dr, Montreal.
1874 Kleinwächter, Prof. L., Grätz.
1865 Krassowski, Professor, St Petersburg.

1871 Lambert, Dr, Paris.
1849 Lawrence, Dr Samuel, Montrose.
1862 Leishman, Professor, Glasgow.
1887 Limont, Dr J., Newcastle-on-Tyne.
1883 Lindsay, Dr D., Pittinain.
1867 Lord, Dr Richard, Bournemouth.

1879 Machattie, Dr Thomas A., Australia.
1859 Macdonald, Dr F. R., Inveraray.
1878 Macdougall, Dr John A., Cannes.
1862 Mackay, Dr M. A., Canada.
1870 M'Kendrick, Prof., Glasgow.
1869 M'Millan, Dr T. L., Australia.
1871 Madden, Dr T. More, Dublin.
1864 Main, Dr William, Heswall.
1879 Marshall, Dr Thomas, London.
1866 Martin, Dr Karl, Berlin.
1860 Martine, Dr William, Haddington.
1882 Maslovsky, Dr, St Petersburg.
1860 Milburn, Dr George, Hayle.
1883 Mills, Dr B. Langley, India.
1861 Mitchell, Sir Arthur, LL.D., Edinburgh.
1877 Moolman, Dr Henry, South Africa.
1869 Mossop, Mr Isaac, Bradford.
1878 Mundé, Dr Paul F., New York.
1862 Murray, Dr David, London.
1859 Myrtle, Dr A. S., Harrogate.

1884 Neve, Dr E. F., Kashmir.
1849 Norris, Mr H., Petherton.

1857 Parker, Dr, Nova Scotia.
1869 Paton, Dr J. W., Rockferry.
1865 Phillippo, Dr J. C., Jamaica.
1853 Priestley, Sir W. O., LL.D., London.

1880 Reid, Dr James More, Aldershot.
1863 Ropes, Dr, Boston, U.S.A.

1878 Serdukoff, Dr A., St Petersburg.
1856 Skinner, Dr T., London.
1861 Stephenson, Prof. W., Aberdeen.
1888 Stevenson, Mr E. Sinclair, Cape of Good Hope.
1854 Storer, Dr H., Boston, U.S.A.
1875 Sutugin, Dr V., St Petersburg.

1867 Thomson, Mr W., Wrenbury.
1880 Turner, Dr William, Gibraltar.

1861 Veale, Dr H. R. L., London.

1872 Wallace, Professor John, Liverpool.
1840 White, Dr F. I., Perth.
1864 Whiteford, Dr James, Greenock.
1845 Wilson, Dr David, Edinburgh.
1865 Wollowicz, Dr C., St Petersburg.

## ORDINARY FELLOWS.

*Note.*—Those marked with an asterisk have been Members of Council. Members of Council continue in office two years.

### (*a.*) LIFE MEMBERS.

| | | Date of Admission. |
|---|---|---|
| | **Barbour, Dr A. H. Freeland, 14 Charlotte Square, | 1879 |
| | Craig, Dr William, 71 Bruntsfield Place, | 1870 |
| | Ross, Dr James F. W., 481 Sherbourne Street, Toronto, Canada, | 1889 |

### (*b.*) ANNUAL SUBSCRIBERS.

| | | |
|---|---|---|
| | Adam, Dr George Rothwell, Carlton House, Hotham Street, East Melbourne, Australia, | 1879 |
| 5 | Adams, Dr George T. Cooke, Heidelberg Road, Alphington, near Melbourne, Victoria, Australia, | 1892 |
| | Affleck, Dr J. O., 38 Heriot Row, | 1869 |
| | Aikman, Dr Alfred, The Elms, Beverley Road, Hull, | 1886 |
| | Aitchison, Dr R. S., 83 Great King Street, | 1886 |
| | Alexander, Dr E. H., Albert Street, Dunedin, New Zealand, | 1891 |
| 10 | Alexander, Dr G. F., A.M.D., Bengal, | 1889 |
| | Alexander, Dr W. B., 8 Blenheim Place, | 1882 |
| | Allison, Dr J., Fuller House, Kettering, Northampton, | 1888 |
| | Anderson, Dr Fred. T., Stanford, Headley, Hants, | 1892 |
| | *Andrew, Dr James, 2 Atholl Crescent, | 1868 |
| 15 | Anglin, Dr W. G., 52 Earl Street, Kingston, Ontario, | 1885 |
| | Archibald, Dr J., 2 The Avenue, Beckenham, Kent, | 1877 |
| | Armitage, Dr J. A., 15 Waterloo Road South, Wolverhampton, | 1886 |
| | Armour, Dr E. F., 149 Bruntsfield Place, | 1889 |
| | Astley, Dr F. Dukenfield, Quyon, Ottawa, Canada, | 1883 |
| 20 | Badger, Dr W., Penicuik, | 1880 |
| | Baildon, Dr F. J., 57 Hoghton Street, Southport, | 1887 |
| | Balfour, Dr Andrew, 12 Abercorn Terrace, Portobello, | 1877 |
| | Balfour, Dr G. W., 17 Walker Street, | 1847 |
| | Balfour, Dr J. Craig, West Street, Belford, Northumberland, | 1884 |
| 25 | *Balfour, Dr T. A. G., 51 George Square, | 1855 |
| | *Ballantyne, Dr A., Dalkeith, | 1870 |
| | Ballantyne, Dr J. W., 24 Melville Street, | 1883 |
| | Barrington, Dr Fourness, care of Commercial Banking Company of Sydney, 18 Birchin Lane, London, E.C., | 1884 |
| | Baumgartner, Dr H. S., Saville Place, Newcastle-on-Tyne, | 1887 |
| 30 | Beattie, Dr Samuel, Pitlochry, | 1888 |
| | Beatty, Dr W. J., Stockton-on-Tees, | 1884 |
| | Bedford, Surgeon-Captain Charles H., M.D., D.Sc., M.R.C.S. Eng., H.M. Indian Medical Service, care of W. Watson & Co., 28 Apollo Street, Bombay, | 1888 |
| | Beilby, Dr Julius H., 10 Clarendon Crescent, | 1892 |
| | Bell, Dr James L., Driffield, Yorkshire, | 1884 |
| 35 | Bell, Dr Robert, 29 Lynedoch Street, Glasgow, W., | 1878 |
| | Bentley, Dr G. H., Kirkliston, | 1877 |
| | Black, Dr Alexander, 13 Howe Street, | 1881 |
| | Black, Dr J. Watt, 15 Clarges Street, Piccadilly, London, W., | 1863 |
| | Blaikie, Dr R. H., 42 Minto Street, | 1888 |
| 40 | Blair, Dr J. A., Straiton Manse, Maybole, | 1887 |
| | Bleloch, Dr A., 2 Lonsdale Terrace, | 1876 |
| | Boddie, Dr G. P., 147 Bruntsfield Place, | 1889 |
| | Booth, Dr William, 2 Minto Street, | 1891 |
| | Borrowman, Dr Philip G., Elie, Fife, | 1893 |
| 45 | Boxill, Dr N. L., Buttalls, St George, Barbados, | 1888 |
| | Boyd, Dr J. St Clair, 27 Victoria Place, Belfast, | 1887 |
| | Brewis, Dr N. T., 23 Rutland Street, | 1883 |
| | Brewis, Dr R. A., Waratah, Tasmania, | 1888 |
| | Brodie, Dr W. Haig, 88 Oxford Ter., Hyde Park, London, W., | 1881 |
| 50 | Brown, Dr R. M. Brown, care of Mr M'Dowell, 56 George Street, | 1892 |

| | | Date of Admission. |
|---|---|---|
| | Bruce, Dr Alexander, 13 Alva Street, | 1887 |
| | Buist, Dr J. W., 1 Clifton Terrace, | 1877 |
| | Burdon, Dr F. L., New Baltimore, Michigan, U.S.A., | 1893 |
| | Cairns, Dr W. Murray, E.P. Mission, Taiwanfoo, Formosa, China, | 1892 |
| 55 | Calder, Dr H. L., 60 Leith Walk, | 1882 |
| | Cameron, Prof. James C., M.D., 941 Dorchester St., Montreal, | 1888 |
| | Campbell, Dr Alexander, 1 Clarendon Terrace, Dundee, | 1885 |
| | *Cappie, Dr James, 37 Lauriston Place, | 1862 |
| | Carmichael, Dr Edward, 12 London Street, | 1887 |
| 60 | **Carmichael, Dr James, 22 Northumberland Street, | 1871 |
| | Chepmell, Dr Charles, 87 Buckingham Road, Brighton, | 1887 |
| | Chown, Dr A. P., 255 Brock Street, Kingston, Canada, | 1891 |
| | **Church, Dr H. M., 36 George Square, | 1875 |
| | Clark, Dr J. A., 4 Cambridge Street, | 1887 |
| 65 | Cobbett, Dr C. N., 45 Rosslyn Hill, Hampstead, London, N.W., | 1890 |
| | Collie, Dr Robert J., St George's Lodge, Catford, London, S.E., | 1883 |
| | **Connel, Dr J., Peebles, | 1869 |
| | Cox, Dr Joshua J., St Ronan's, Eccles, Manchester, | 1876 |
| | **Croom, Dr J. Halliday, 25 Charlotte Square, | 1870 |
| 70 | Cruickshank, Dr B., Nairn, | 1885 |
| | Cullen, Dr G. M., 48 Lauriston Place, | 1890 |
| | Cumming, Dr A. S., 18 Ainslie Place, | 1885 |
| | Cunningham, Dr John, Port Chalmers, New Zealand, | 1888 |
| | Currie, Dr A. S., 81 Queen's Road, Finsbury Park, London, N., | 1882 |
| 75 | Darling, Dr T. Brown, 165 Bruntsfield Place, | 1884 |
| | Davidson, Dr D. G., 17 Granville Terrace, | 1892 |
| | Davies, Dr E. T., 97 Shaw Street, Liverpool, | 1887 |
| | Dendle, Dr Frank, Lochgelly, Fife, | 1892 |
| | D'Evelyn, Dr F. W., The Mariposa, 824 Laguna Street, San Francisco, | 1887 |
| 80 | Deverell, Dr H. C., 12 Windsor Street, | 1882 |
| | Dewar, Dr M., 24 Lauriston Place, | 1891 |
| | Dick, Dr J. L., 61 Dalry Road, | 1892 |
| | Dickson, Dr George, 9 India Street, | 1867 |
| | Douglas, Dr A. Home, 4 Palmerston Place, | 1888 |
| 85 | Douglas, Dr Carstairs, 3 Eglinton Place, Skelmorlie, Ayrshire, | 1890 |
| | Drumheller, Dr F. E., 406 Market St., Sunbury, Pennsylvania, | 1887 |
| | Dubourg, Dr J. R. H., 120 Islington, Liverpool, | 1887 |
| | Duncan, Dr A. J., Nethergate House, Nethergate, Dundee, | 1879 |
| | Duncan, Dr A. S., P. & O. s.s. "Ganges," Royal Albert Dock, London, | 1890 |
| 90 | Dunlop, Dr H. M., 20 Abercromby Place, | 1884 |
| | Dunsmure, Dr J., 53 Queen Street, | 1876 |
| | Easterbrook, Dr C. C., 17 London Street, | 1892 |
| | Eden, Dr T. Watts, Hospital for Women, Fulham Road, London, S.W., | 1888 |
| | Elder, Dr W. Nicol, 6 Torphichen Street, | 1879 |
| 95 | Evans, Dr O. F., 79 Mulgrave Street, Liverpool, | 1890 |
| | Farquharson, Dr J. D., 242 Westgate Road, Newcastle-on-Tyne, | 1890 |
| | Felkin, Dr R. W., 8 Alva Street, | 1884 |
| | Fenwick, Dr Kenneth N., 141 King Street West, Kingston, Canada, | 1885 |
| | Ferguson, Dr J. Haig, 25 Rutland Street, | 1885 |
| 100 | Finlay, Dr W. A., St Helen's, Russell Place, Trinity, | 1880 |
| | Fitz-Gerald, Dr James, Kaitangata, Otago, New Zealand, | 1890 |
| | Foggin, Dr George, 63 Westmorland Road, Newcastle-on-Tyne, | 1892 |
| | Forbes, Dr A., Liberton, | 1887 |
| | Forde, Dr E. S., Gorebridge, | 1893 |
| 105 | Fordyce, Dr William, 14 Charlotte Square, | 1888 |
| | **Foulis, Dr James, 34 Heriot Row, | 1878 |
| | Fowler, Dr Simson C., Juniper Green, | 1892 |

| | | Date of Admission. |
|---|---|---|
| | Fox, Dr James, Oak House, Croston, near Preston, Lancashire, | 1889 |
| | Fox, Dr J. W., 53 Augusta Street, Poplar, London, E., | 1887 |
| 110 | Fraser, Dr F. W. Dyce, Gorton House, Lasswade, | 1883 |
| | Fraser, Dr H. E., Island Bank House, Inverness, | 1892 |
| | Fraser, Dr J. Joynor, Hessle, East Yorks, | 1880 |
| | Fraser, Dr Nutting S., 228 Duckworth Street, St John's, Newfoundland, | 1887 |
| | Freeland, Dr Richard, Broxburn, | 1879 |
| 115 | Gayton, Dr William, Bartram Lodge, Fleet Road, Hampstead, London, N.W., | 1885 |
| | Gemmell, Dr J. E., 12 Rodney Street, Liverpool, | 1885 |
| | Gibson, Dr W. A., 8 Sussex St., Warwick Sq., London, S.W., | 1888 |
| | Gibson, Dr W. Scott, Skipton, Yorks, | 1890 |
| | Giffen, Dr J. J. M., Thornville, Jordanstown, Belfast, | 1892 |
| 120 | Giles, Dr A. B., 1 Kew Terrace, | 1891 |
| | Gilmour, Dr T. F., Port Ellen, Islay, | 1882 |
| | Glaister, Dr John, 4 Grafton Place, Grafton Square, Glasgow, | 1879 |
| | Gracie, Dr C. B., Buccleuch Villa, Burntisland, | 1885 |
| | Graham, Dr J. Gibson, 5 Ashgrove Ter., Partickhill, Glasgow, | 1888 |
| 125 | Graham, Dr R. Balfour, Leven, Fife, | 1893 |
| | Grasett, Dr F. L., 208 Simcoe Street, Toronto, Canada, | 1877 |
| | Gray, Dr H. St Clair, 15 Newton Terrace, Glasgow, | 1891 |
| | Greene, Dr J. W. N., 127 Zabala, Monte Video, | 1889 |
| | Gulland, Dr G. L., 6 Randolph Place, | 1890 |
| 130 | Guthrie, Dr A. Cowan, Swanville, Newhaven Road, | 1888 |
| | Hamilton, Dr J. R., Hawick, | 1879 |
| | Hamp, Dr J. Walton, Penn Road, Wolverhampton, | 1886 |
| | Hardcastle, Dr H. M., Archbold Lodge, Newcastle-on-Tyne, | 1886 |
| | Hardie, Dr Thomas, 10 John's Place, Leith, | 1870 |
| 135 | Harkness, Dr A. C., 21 Ainslie Place, | 1891 |
| | ***Hart, Dr D. Berry, 29 Charlotte Square, | 1877 |
| | Harvey, Dr Charles G., Kingswood, Sav-la-Mar, Jamaica, W.I., | 1889 |
| | Harvey, Dr James, 1 Leopold Place, | 1891 |
| | *Haultain, Dr F. W. N., 17 Rutland Street, | 1884 |
| 140 | Havelock, Dr J. G., Sunnyside, Montrose, | 1888 |
| | Hay, Dr Henry, 7 Brandon Street, | 1879 |
| | Helm, Dr J. H., Ratho, | 1888 |
| | Helm, Dr R. Dundas, 8 Brunswick Street, Carlisle, | 1892 |
| | Henderson, Dr Alexander, 17 Fettes Row, | 1891 |
| 145 | Henderson, Dr John, 7 John's Place, Leith, | 1857 |
| | Hewetson, Dr J., Holmfield, Reigate, | 1881 |
| | Hillier, Dr A. P., Kimberley, Cape Colony, | 1882 |
| | Hooper, Dr J. W. D., Lying-in Hospital, Melbourne, Australia, | 1884 |
| | Howard-Jones, Dr J., Dowlais, Glamorganshire, | 1893 |
| 150 | *Hunter, Dr George, 33 Palmerston Place, | 1881 |
| | Hurst, Dr George, Scott Chambers, 96 Pitt St., Sydney, N.S.W., | 1881 |
| | Husband, Dr William, 4 Royal Circus, | 1857 |
| | Hutcheson, Dr J., 44 Moray Place, | 1888 |
| | Hyslop, Dr J. M'A., 22 Palmerston Place, | 1874 |
| 155 | Inch, Dr Robert, Gorebridge, | 1887 |
| | Jamieson, Dr Hugh, Hospital Inglas, Monte Video, | 1889 |
| | Jamieson, Dr Hugh, care of Dr Luke, 39 East Main Street, Titusville, Pa., U.S.A., | 1889 |
| | Jamieson, Dr James, 43 George Square, | 1866 |
| | Johnston, Dr D. W., 34 Woodburn Terrace, | 1892 |
| 160 | Johnston, Dr W., Stirling, | 1871 |
| | Keiller, Dr A. J., 54 Northumberland Street, | 1889 |
| | Keiller, Prof. Wm., Medical College, Galveston, Texas, U.S.A., | 1890 |
| | King, Dr J. K., The Glen Springs Sanitorium, Watkins, New York, U.S., | 1884 |
| | Kirk, Dr Robert, Bathgate, | 1887 |
| 165 | Kynoch, Dr Campbell, 30 Springfield, Dundee, | 1892 |

| | | Date of Admission. |
|---|---|---|
| | Lackie, Dr James, 14 Hope Street, | 1889 |
| | Laing, Dr J. H. A., 11 Melville Street, | 1891 |
| | Langwell, Dr H. G., 49 Charlotte Street, Leith, | 1891 |
| | Lawson, Dr Thomas, 16 Dean Terrace, | 1891 |
| 170 | Lee, Dr Herbert E., Leeholme, Woodville, N.S.W., Australia, | 1892 |
| | Leigh, Dr J. Dickinson, The White House, Brotton, Yorkshire, | 1886 |
| | Leslie, Dr G., Old Manse, Falkirk, | 1886 |
| | Lester, Dr Charles E., Mudgee, N.S.W., Australia, | 1891 |
| | Linton, Dr John, 60 George Square, | 1863 |
| 175 | Linton, Dr Simon, Grangemouth, | 1887 |
| | Little, Dr W. C., Warracknabeal, Victoria, Australia, | 1889 |
| | Littlejohn, Dr Harvey, 13 Victoria Road, Sheffield, | 1890 |
| | Lockhart, Dr F. A. L., 59 Metcalfe, Montreal, Canada, | 1890 |
| | Lucas, Dr Robert, Dalkeith, | 1871 |
| 180 | Lundie, Dr William, 3 Glengyle Terrace, | 1888 |
| | Lyle, Dr F. W., 50 Grange Road, | 1890 |
| | M'Call, Dr John, 4 Leopold Place, | 1886 |
| | M'Callum, Dr H., Pitlochry, | 1887 |
| | M'Creadie, Dr William, 164 Ferry Road, | 1887 |
| 185 | Macdonald, Dr W. B., Dunbar, | 1887 |
| | Macdonald, Dr W. Fraser, Auchtermuchty, | 1884 |
| | M'Ewen, Dr Hugh, Carleton Place, Ontario, Canada, | 1890 |
| | Macgregor, Dr G. S., 2 Burnbank Terrace, Glasgow, | 1888 |
| | Mackay, Dr George, 2A Gilmore Place, | 1879 |
| 190 | Mackay, Dr G. Hugh, Elgin, | 1884 |
| | Mackenzie, Dr R., 1 Bruntsfield Terrace, | 1887 |
| | MacLachlan, Dr A., Beauly, | 1887 |
| | M'Lean, Dr Archibald, Peebles, | 1890 |
| | M'Murtry, Dr L. S., Louisville, Kentucky, U.S.A., | 1889 |
| 195 | M'Nab, Dr John, Obbe, Harris, Stornoway, | 1873 |
| | Mackness, Dr G. O. C., Fort Street House, Broughty-Ferry, | 1887 |
| | Macrae, Dr John, Lynwood, Murrayfield, | 1893 |
| | M'Vety, Dr A. Franklin, 235 12th Bath Street, Toledo, Ohio, | 1893 |
| | Macvie, Dr S., Chirnside, | 1881 |
| 200 | M'Watt, Dr John, The Square, Duns, | 1879 |
| | Macwatt, Dr R. C., Indian Medical Service, 15th Bengal Cavalry, care of Messrs King, King, & Co., Bombay, | 1885 |
| | Maddox, Dr Ralph H., I.M.S., care of Messrs William Watson & Co., 28 Apollo Street, Bombay, | 1887 |
| | Mann, Dr F. W., Old Square, Ashton-on-Lyne, | 1889 |
| | Marshall, Dr G. Balfour, 4 E. Castle Road, | 1891 |
| 205 | Marshall, Dr William, Milnathort, | 1884 |
| | Martin, Dr Charles, 22 Broad Street, Birmingham, | 1892 |
| | Martin, Dr Christopher, 22 Broad Street, Birmingham, | 1888 |
| | Martin, Dr J. W., 59 Ferry Road, Leith, | 1887 |
| | Matheson, Dr A. A., 33 Buccleuch Place, | 1887 |
| 210 | Matheson, Dr F. W., | 1888 |
| | *Matthew, Dr Alexander, Corstorphine, | 1885 |
| | Menzies, Dr David, 20 Rutland Square, | 1877 |
| | Messer, Dr Fordyce, Helensburgh, | 1866 |
| | Michael, Dr Gustave, 188 Commercial Road, London, E. | 1885 |
| 215 | Millard, Dr W. W., 3 George Place, | 1884 |
| | Miller, Dr W. H., 6 West Circus Place, | 1886 |
| | Milligan, Dr D., 11 Palmerston Place, | 1893 |
| | Mills, Dr James, Janesville, Wisconsin, U.S.A., | 1885 |
| | Mitchell, Dr G. B., Brechin, | 1893 |
| 220 | Moir, Dr Alex., 30 Buccleuch Place, | 1876 |
| | Moorhouse, Dr J. Ernest, Cardenden, Fife, | 1892 |
| | More, Dr James Rothwell, Kettering, Northampton, | 1880 |
| | Morison, Dr Albert E., Brougham Terrace, Hartlepool, | 1888 |
| | Mowat, Dr John, 1 Hope Park Terrace, | 1884 |
| 225 | Munro, Dr A. Watson, 183 Liverpool Street, Sydney, Australia, | 1892 |

| | | Date of Admission. |
|---|---|---|
| | Murphy, Dr James, Holly House, Sunderland, | 1877 |
| | Murray, Dr A. Lang, 18 Duddingston Park, Portobello, | 1889 |
| | Murray, Dr D. R., 41 Albany Street, Leith, | 1878 |
| | Murray, Dr James, 1 Brandon Street, | 1879 |
| 230 | Murray, Dr R. Milne, 10 Hope Street, | 1880 |
| | Nairne, Dr J. Stuart, 12 Royal Crescent, Crosshill, Glasgow, | 1889 |
| | Napier, Dr A. D. L., 67 Grosvenor Street, Grosvenor Square, London, W., | 1878 |
| | Narayan, Mr Kumar B., Cooch, Behar, India, | 1888 |
| | Nesham, Dr T. Cargill, 12 Ellison Place, Newcastle-on-Tyne, | 1885 |
| 235 | Niekerk, Dr Alexander van, Box 68, Johannesburg, S. African Republic, | 1891 |
| | Nisbet, Dr W. B., Townsville, N. Queensland, Australia, | 1886 |
| | Oakes, Dr Arthur, | 1879 |
| | *Oliphant, Dr E. H. Lawrence, 18 Burnbank Terrace, Glasgow, | 1885 |
| | Orr, Dr John, Innerleithen, | 1887 |
| 240 | Orr, Dr W. Basil, 13 Braid Road, | 1889 |
| | Pairman, Dr T. Wyld, H.M. Prison, Lyttelton, New Zealand, | 1883 |
| | Palmer, Dr J. C., | 1892 |
| | Pareira, Dr Jervis, Delegado da Saude, do Districto de Lourenço Marguz, Em Mozambique Africa Portuguesa, | 1888 |
| | Paterson, Dr G. Keppie, 17 Forth Street, | 1882 |
| 245 | Paterson, Dr William, 4 Thirlestane Road, | 1890 |
| | Peddie, Dr Alexander, 15 Rutland Street, | 1840 |
| | Peddie, Dr H. Anderson, 24 Palmerston Place, | 1882 |
| | Perigal, Dr A., New Barnet, Herts, | 1887 |
| | Peters, Dr James A., Kirkland House, Arbroath, | 1892 |
| 250 | Petrie-Simpson, Dr W., 29 Lauder Road, | 1892 |
| | Pirie, Dr John, 9 Henderson Terrace, | 1888 |
| | ***Playfair, Dr John, 5 Melville Crescent, | 1873 |
| | Ponder, Dr Charles F., | 1892 |
| | Poole, Dr T. D., Aberdeen Cottage, Poulton-le-Fylde, | 1890 |
| 255 | Porteous, Dr J. Lindsay, 83 Warburton Avenue, Yonkers, New York, | 1875 |
| | Price, Dr A. W. Gordon, 9 Grange Road, | 1890 |
| | Price, Dr E. F. T., 1 Middleby Street, | 1890 |
| | Price, Dr Joseph, 500 20th Street, Philadelphia, U.S.A., | 1889 |
| | Primrose, Dr Alex., 196 Simcoe Street, Toronto, Canada, | 1887 |
| 260 | Pringle, Dr J. Hogarth, 256 Bath Street, Glasgow, | 1886 |
| | Proudfoot, Dr Thomas, 13 Lauriston Place, | 1884 |
| | Puckle, Dr S. Hale, Bishop's Castle, Shropshire, | 1885 |
| | Ranking, Dr J. E., Tunbridge Wells, | 1881 |
| | *Rattray, Dr A. M. T., Portobello, | 1869 |
| 265 | **Reid, Dr W. L., 7 Royal Crescent, Glasgow, W., | 1880 |
| | Reid, Dr W. Spence, Oakley, Kirkcudbright, | 1880 |
| | Rendell, Dr Herbert R., P.O. Box 606, St John's, Newfoundland, | 1882 |
| | Richardson, Dr William, Bath Lodge, Reading, | 1884 |
| | Ritchie, Dr A. Brown, 117 Boston Street, Hulme, Manchester, | 1892 |
| 270 | Ritchie, Dr D. W. L., 22 East Claremont Street, | 1883 |
| | *Ritchie, Dr James, 22 Charlotte Square, | 1880 |
| | *Ritchie, Dr R. Peel, 1 Melville Crescent, | 1861 |
| | Roberton, Dr Ernest, Auckland, New Zealand, | 1887 |
| | Roberts, Dr Ernest T., 85 Skipton Road, Keighley, | 1890 |
| 275 | Robertson, Dr J., 30 Lauriston Place, | 1881 |
| | Robertson, Dr John A., 48 Bridge Street, Worksop, Notts, | 1892 |
| | Robertson, Dr W. B., St Anne's, Thurlow Park Road, West Dulwich, London, S.E., | 1870 |
| | Robertson, Dr W. G. A., 26 Minto Street, | 1889 |
| | Robins, Dr H., | 1893 |
| 280 | Robinson, Dr H. Shapter, Talfourd House, Talfourd Road, Camberwell, London, S.E., | 1890 |

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|---|---|---|
| | Robson, Dr B. S., 66 Brighton Grove, Newcastle-on-Tyne, | 1887 |
| | Ronalds, Dr Tennent, Knockbrex, Kirkcudbright, | 1887 |
| | *Ronaldson, Dr T. R., 3 Bruntsfield Terrace, | 1877 |
| | Rosa, Dr Albert F., 20 Dundonald Street, | 1893 |
| 285 | Rosa, Dr George, 12 Gayfield Square, | 1867 |
| | Rowland, Dr L. Lindsay, Salem, Oregon, U.S.A., | 1879 |
| | Rumboll, Dr Sydney, Hope Villa, Hillary Place, Leeds, | 1886 |
| | Russell, Dr W., 46 Albany Street, | 1890 |
| | Salmon, Dr C. Carty, Daisyhill, Amherst, Victoria, Australia, | 1891 |
| 290 | Sang, Dr J. E., Balcownie, Bedford Hill, Balham, London, S.W., | 1889 |
| | Saunders, Dr F. A., Grahamstown, Cape Colony, South Africa, | 1885 |
| | Schofield, Dr L. J., Warresburg, Mo., U.S.A., | 1893 |
| | Scott, Dr T. R., Musselburgh, | 1880 |
| | Shaw, Dr W. J., Innerleithen, | 1892 |
| 295 | Shiels, Dr G. F., 229 Geary Street, San Francisco, | 1887 |
| | Simitopoulas, Dr C. D., | 1892 |
| | *****Simpson, Professor Alexander R., 52 Queen Street, | 1858 |
| | Simpson, Dr James, Eastwood, Ferry Road, | 1882 |
| | Sloan, Dr Allen T., 22 Forth Street, | 1893 |
| 300 | *Sloan, Dr S., 5 Somerset Pl., Sauchiehall St. West, Glasgow, | 1887 |
| | Smart, Dr David, 74 Hartington Road, Sefton Park, Liverpool, | 1882 |
| | Smith, Dr D., Fullerton Cottage, Johnshaven, Montrose, | 1870 |
| | Smith, Dr G. H. Walton, Blenheim, 138 Point Piper Road, Paddington, Sydney, Australia, | 1892 |
| | Smith, Dr Gains T., Moncton, New Brunswick, Canada, | 1891 |
| 305 | Smith, Dr James, 1 Parsonsgreen Terrace, | 1891 |
| | Smith, Dr John, Brycehall, Kirkcaldy, | 1885 |
| | Smith, Dr J. Gordon, Braemar, Port Antonio, Jamaica, | 1892 |
| | Smith, Dr William, 14 Hartington Gardens, | 1890 |
| | Smith, Dr W. Ramsay, Plas Newydd, Rhyl, | 1892 |
| 310 | Sneddon, Dr William, Cupar-Fife, | 1888 |
| | Somerville, Dr Robert, Galashiels, | 1881 |
| | Spalding, Dr William, Gorebridge, | 1867 |
| | Spence, Dr R., Burntisland, | 1878 |
| | Spence, Dr William, Dollar, | 1884 |
| 315 | Stewart, Dr J. S., 5 Merchiston Place, | 1884 |
| | Stewart, Dr R., 42 George Square, | 1885 |
| | Stirling, Dr R., 4 Athole Place, Perth, | 1892 |
| | Stirling, Dr Stewart, 6 Clifton Terrace, | 1866 |
| | Sturrock, Dr J. F., Homewood, Broughty-Ferry, | 1887 |
| 320 | Sutherland, Dr G. A., 45 Carlton Hill, St John's Wood, London, N.W., | 1887 |
| | Sym, Dr A. C., 144 Morningside Road, | 1885 |
| | *Taylor, Dr William, 12 Melville Street, | 1868 |
| | Teacher, Dr C., 16 Newington Road, | 1887 |
| | Temple, Dr G. H., Salford Union Infirmary, Eccles, Manchester, | 1888 |
| 325 | Tennent, Dr J. T., Bathgate, | 1888 |
| | Thatcher, Dr C. H., 8 Melville Crescent, | 1877 |
| | Thin, Dr Robert, 6 Albany Street, | 1891 |
| | Thom, Dr Alexander, Viewfield, Crieff, | 1884 |
| | Thomson, Dr A. D. R., Musselburgh, | 1877 |
| 330 | Thomson, Dr Alexis, 2 Coates Crescent, | 1887 |
| | Thomson, Dr James, David Place, St Heliers, Jersey, | 1881 |
| | *Thomson, Dr John, 14 Coates Crescent, | 1887 |
| | Thomson, Dr J. Stitt, Dalkeith, | 1877 |
| | Thyne, Dr T. J., 2 Dean Terrace, | 1887 |
| 335 | Tod, Dr John, 93 Ferry Road, Leith, | 1892 |
| | Tristan, Dr R. J., Retford, Notts, | 1887 |
| | Turnbull, Dr James L., Newton P.O., Ontario, Canada, | 1889 |
| | Turnbull, Dr M., Coldstream, | 1869 |
| | **Underhill, Dr C. E., 8 Coates Crescent, | 1872 |
| 340 | Underhill, Dr Fred. T., 37 Owen Street, Tipton, Staffordshire, | 1858 |

| | | Date of Admission |
|---|---|---|
| | Underhill, Dr T. Edgar, Bromsgrove, Worcestershire, | 1879 |
| | Vassie, Dr Alexander H., Lisaghmore, Kirkcaldy, | 1891 |
| | Vickery, Dr W. H., 52 Elswick Road, Newcastle-on-Tyne, | 1892 |
| | Wade, Dr George, Melrose, | 1893 |
| 345 | Walker, Dr Andrew, 8 Hope Street, | 1893 |
| | Walker, Dr A. Wallace, 24 Forth Street, | 1886 |
| | Wallace, Dr Abraham, 64 Harley Street, London, W., | 1879 |
| | Watson, Dr P. H., 72 Jesmond Road, Newcastle-on-Tyne, | 1887 |
| | Watson, Dr W., 54 Mayfield Road, | 1865 |
| 350 | Waugh, Dr John, 36 Finsbury Pavement, London, E.C., | 1881 |
| | *Webster, Dr A. D., 20 Newington Road, | 1881 |
| | Webster, Dr J. C., 20 Charlotte Square, | 1889 |
| | Welby, Dr Frederick E., Colonial Surgeon, St Helena, | 1889 |
| | Whitton, Dr A. B., Aberchirder, | 1886 |
| 355 | Wicks, Dr Charles, South View, 14 Fortune Green Lane, West Hampstead, London, N.W., | 1887 |
| | Wilcockson, Dr G. Morton, 4 Gladstone Road, Chesterfield, | 1893 |
| | Wilkinson, Dr George, 109 Park Road, Liverpool, | 1889 |
| | Will, Dr Ogilvie, 379 Union Street, Aberdeen, | 1867 |
| | Williams, Dr J. D., Gwerullwyn House, Dowlais, South Wales, | 1889 |
| 360 | Wilson, Dr James, 53 Inverleith Row, | 1889 |
| | *Wilson, Dr T. D., 10 Newington Road, | 1879 |
| | Wise, Dr Robert, 5 Weston Park, Crouch End, London, N., | 1890 |
| | Wood, Dr A. Fleming, City Fever Hospital, | 1889 |
| | Wood, Dr Isaac, Kingston, Ontario, | 1893 |
| 365 | Wood, Dr Russell, 9 Darnaway Street, | 1880 |
| | Wood, Dr Thomas, 55 Ferry Road, | 1886 |
| | Wood, Dr William, 19 Roxburgh Street, | 1892 |
| | Wright, Dr W. F., Bonnington Mount, Bonnington Terrace, | 1887 |
| | Wylie, Dr Hamilton, 1 George Place, | 1879 |
| 370 | Yoe, Dr Richard T., Louisville, Kentucky, U.S.A., | 1891 |
| | Young, Dr J. Y. Simpson, Swinton, Berwickshire, | 1891 |
| | *Young, Dr Peter, 43 Heriot Row, | 1859 |
| | **Young, Dr Peter A., 25 Manor Place, | 1871 |
| 374 | Young, Dr R. J. Erskine, 14 Ainslie Place, | 1892 |

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# TRANSACTIONS

OF THE

# EDINBURGH OBSTETRICAL SOCIETY,

## FOR SESSION LIV., 1892-93.

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MEETING I.—NOVEMBER 9, 1892.

Professor A. R. SIMPSON, *President, in the Chair.*

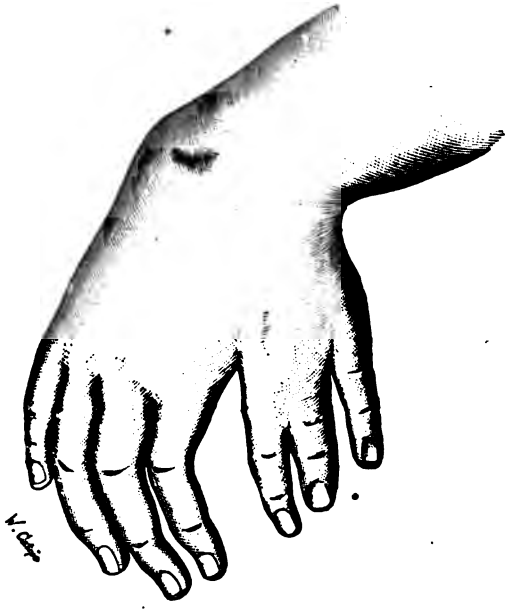
## I. AN INFANT WITH A BIFID HAND.

By J. W. BALLANTYNE, M.D., F.R.C.P. Ed., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Diseases of Women, Medical College for Women, Edinburgh; Physician for Diseases of Women and Practical Obstetrics, Western Dispensary, Edinburgh; and Secretary to the Edinburgh Obstetrical Society.

I HAVE to-night the honour of exhibiting to this Society an infant with an interesting deformity of the right hand. The subject of the malformation is a male infant, one year and five months old. The mother is nearly 41 years of age, and has given birth to ten full-time living children, and has had two miscarriages; two of the children have died, and the infant exhibited is the youngest of the survivors. The deformity of the right hand was noted at the time of birth by the medical man in attendance. There was no history of any abnormal symptoms during the mother's pregnancy, nor was there any suspicion of a maternal impression. The child was healthy up to the age of five months, when some convulsive attacks occurred, and he was taken into the Sick Children's Hospital; thence he was transferred to the Fever Hospital for varicella, and later he was treated in the Eye Wards of the Royal Infirmary for iritis, etc. He has lost the sight of the right eye. I saw him for the first time at my Children's Clinique in the Cow-

gate Dispensary a fortnight ago. There were no anomalies of the fingers or toes in the case of any of his brothers or sisters, and there was not in the family history of the mother or father any indication of the occurrence of deformities such as that seen in this infant.

A drawing was made of the deformed hand (*vide* accompanying Figure); but this scarcely conveys a correct impression of its appearances, for in order to sketch it the fingers had to be spread out, whilst their natural position is a partially flexed one. The hand hangs down in a helpless fashion, which reminds one of the "wrist-drop"



Bifid Hand. (Natural size.)

in lead poisoning cases, and the arm always tends to be pronated and half-flexed at the elbow-joint. There are seven digits, and these are divided into two groups, a radial and an ulnar, by an interdigital sulcus, which is somewhat deeper than any of the others. The ulnar or internal group consists of four digits, each made up of three phalanges; the innermost of these is no doubt the little finger; then follow the ring, middle, and index as one passes towards the radial side of the hand. The thumb is wanting. This group of digits no doubt constitutes the right hand proper of the infant, whilst the fingers on the radial side are supernumerary, and make up the deformity. This radial group consists of three digits, of which that on the radial side is the little finger, whilst the other two are probably the ring and middle fingers. Each has three phalanges, but the ring and middle fingers are webbed in the

region of their proximal phalanges. These three fingers are usually flexed upon the other part of the double hand, and the little finger lies under the other two digits. Each of the seven fingers has its own metacarpal bone; and whilst the four members of the ulnar group seem to articulate in the usual way with each other and with the unciform, os magnum, and trapezoid, those of the radial group probably form joints with more than one articular facet on the trapezium, and possibly also with a surface on the lower end of the radius. It does not seem that the carpal bones are increased in number, for the right wrist has the same measurement as the left: each measures 10 cms. in circumference. The lower end of the ulna does not appear to articulate normally with the carpus: a gap is felt, and this shows itself by a deep dimple on the skin surface. The muscles on the flexor aspect of the arm are well developed; those on the extensor aspect are weak.

In addition to the deformity of the hand there is an abnormal condition of the elbow on the same side: It is not certain whether or not this also was congenital, for the mother first noticed it when the child was about five months old, but in all probability it existed at birth. It seems as if the ulna were dislocated inwards. Distinct creaking is felt at the elbow on moving the forearm, and the child seems to suffer some pain from the manipulation. This elbow measured 16 cms. in circumference, whilst the left measured 15 cms. The other hand and both the feet were normal.

I regard this case as an example of bifidity of the distal segment of the right upper limb, and look upon the seven digits and metacarpal bones as the representatives of two hands—the ulnar group making up one, the radial the other. Both thumbs are absent, and the furthest apart digits are probably the little fingers. In the radial series the index is, no doubt, missing also. It is as if the right and left hands were welded together, the index of the one coming into juxtaposition with the middle finger of the other. The bifidity extends as far as the wrist, but it is doubtful whether it affects the carpus as well as the metacarpus.

Cases similar to the above have seldom been recorded; but three at least have been described which closely resembled it. Taruffi[1] has, indeed, collected four cases of bifid hand (dichirus monopleurus); but one of these, that reported by Ambrosini in Aldrovandi's *Monstrorum Historia*, is of doubtful authenticity, and had better be neglected.

The first well-reported case was that described by J. Jardine Murray[2] in 1862, under the title of "A Case of a Woman with Three Hands." The patient, a healthy married woman, 38 years of age, had one child that showed no abnormality, and, so far as she knew, none of her relatives had had a deformed hand. The left upper

[1] Taruffi (C.), *Storia della Teratologia*, tom. iii. p. 419. Bologna, 1886.

[2] Murray (J. J.), *Medico-Chirurgical Transactions*, vol. xlvi. p. 29. London, 1863.

limb, which was very muscular, was the part affected; the shoulder was normal; the elbow-joint could be extended, but could not be more than half-flexed, probably from enlargement of the coronoid process of the ulna; and there was a bifid hand. The circumference of this arm, both at elbow and wrist, was greater than that of the right. Pronation and supination were not interfered with. The bifid hand had eight digits, each with three phalanges and a metacarpal bone. The fingers were in two groups, a radial and an ulnar; each group was made up of four digits—index, middle, ring, and little. The thumbs were represented by a slight prominence on the dorsal surface. The radial series of digits constituted the supernumerary hand, and its ring and middle fingers were webbed up to the level of their first phalanges. The radial part of the double hand was somewhat smaller than the ulnar. All the fingers were webbed at their tips. The malformed hand could grasp well, but not so strongly as the right member. Murray believed that the duplicity of bony structure began at the carpus.

A case, apparently very similar to the above, was mentioned by Giraldès in his work on the Surgical Diseases of Children, published in 1868.[1] He operated on the child, a boy, and removed the supernumerary hand; but he does not say on which side of the body the hand was double. There were eight digits in two series, the thumbs were absent, and the fingers were arranged in inverse order, the little fingers being the furthest apart, and the two index digits being in apposition.

Fumagalli[2] reported at greater length the case which came under his care. The infant, a female, was fourteen months old. There was no family history of deformity. The right hand was bifid: it possessed eight digits, arranged in two series, a radial and an ulnar; the external or radial group constituted the deformity. There were no indications of thumbs. Each one of the four supernumerary digits was articulated with an incomplete metacarpal bone. There was anchylosis of the elbow-joint of the deformed limb: it was fixed at a right angle. The supernumerary fingers were smaller than the others, and their movements were rather limited. One part of the bifid hand could grasp the other. Fumagalli, after consultation with his colleagues, amputated the supernumerary metacarpals and digits.

The resemblances between these cases and mine were very striking. The only real point of difference was in the number of digits: there were eight fingers in the specimens above noted, and seven in the case of the infant shown to-night. The thumbs were absent in all. The deformity was in every instance unilateral. In three out of the four cases there was partial anchylosis of the elbow-

[1] Giraldès (M.), *Maladies Chirurgicales des Enfants*, p. 42. Paris, 1868.

[2] Fumagalli (C.), "Sulle difformita congenite delle dita," *Annali universali di Medicina*, vol. ccxvi. p. 313. Milano, 1871.

joint of the deformed limb. The ring and middle fingers of the supernumerary hand were webbed in two instances.

The condition may be regarded as a grave form of polydactyly, or it may be looked upon as a separate variety of melomelus. The deformity called melomelus includes all the cases in which a supernumerary limb is attached to the normal member, and there are, according to Taruffi, four varieties of it. In the first the duplicity affects the upper arm (dibrachius); in the second, the forearm (diantibrachius); in the third, the hand (dichirus); and in the fourth, the fingers (polydactylus). My specimen, then, according to this classification, belongs to the variety dichirus monopleurus of the class melomelus of the asymmetrical disomata. The condition in its graver forms is very rare in the human subject; but it appears to be more common in some of the lower animals (calf, pig, ram, frog, lamb, chick, duck, triton, axolotl, etc.). Two or three cases have been reported in which similar conditions were found in the lower limb of the human subject.

## II. PRESIDENTIAL ADDRESS.

By Alexander Russell Simpson, M.D., President of the Royal College of Physicians, and Professor of Midwifery and the Diseases of Women and Children in the University of Edinburgh.

Gentlemen,—As we meet to enter on the work of the fifty-fourth session of our Society, we find it our first sad duty to note that one of the most familiar names in Edinburgh obstetrics has fallen from our roll of Fellowship. At the close of last session we paid Dr Alexander Keiller the rare compliment of adding his name to the list of our Honorary Fellows; and we hoped that he might for some length of time wear the honour, so hale and hearty he always looked, and so lightly he seemed to bear the weight of his fourscore years. But a paralytic stroke prostrated him in his seaside home at North Berwick, and though he retained his consciousness for some days, he sank under what his friends took to be a cerebral apoplexy, and died on the 26th of September.

Many of you must have read sympathetically the interesting and adequate sketch of his life-course that has already appeared in the November number of the *Edinburgh Medical Journal.* None the less you will allow me now to indicate a little more fully his relations to our Society and our subject than it was possible for the obituarist to do.

There was a kind of ebb in the activity of the Society the year before Dr Keiller was admitted to its membership. The record of the whole session of 1845-46 only occupies three MS. pages of the Minute-book. The treasurer could report a balance of £40, 2s. 2d. in favour of the Society, in consideration whereof, "it

was agreed to call for no annual contribution from members" that year. The records of the six meetings of which the session consisted, and which continued to be held alternately in the houses of the various members, usually tell merely that "the evening was spent in conversation on obstetric subjects," or that "the ordinary business was transacted." Only on the December evening the conversation is reported as taking up "more particularly the subject of the operation for removal of the ovary." That session had already run its course by April. The next did not commence till January 1847. But the tide had now turned. Through the intervention of Dr Graham Weir, the Society gathered in the room in the New Town Dispensary, which was the scene of many an animated discussion, and where the meetings were continued for many years. It was on the 20th of January that the session opened, and the night was made memorable—as may be read in the clear handwriting of Dr Cumming—by Dr Simpson relating the case of a woman he had delivered the previous evening while she was under the influence of sulphuric ether. It was the first intimation of the beneficent idea of the use of anæsthetics in labour. If Dr Keiller was present when he was proposed for membership by Dr Simpson and Dr Cumming at the next meeting, he must have heard his proposer give more full details of that first case, and relate the histories of the others that formed the basis of his earliest experience, and encouraged him to go forward in his anæsthetic researches. Dr Keiller's own earliest contribution to the Society arose from a discussion on the night of his admission on spontaneous evolution, when Dr Martin Barry and others related cases that had come under their observation. In connexion with this Dr Keiller told of a striking instance that had occurred to him when practising in Dundee.

The years of practice in Dundee, I ought perhaps to remark by way of parenthesis, ran from 1837 to 1844, instead of at the later period indicated in the biographical notice. Perhaps his friendship with Sir James Simpson was among the factors that determined his removal from Dundee to the metropolis. He used sometimes at our obstetrical dinners to tell us of their first sight of each other. Keiller and one or two others were working in the shop of Pugh & Plews, chemists in Dundas Street, where they were learning dispensing, when a little fellow with a big head was brought in by some relative, probably his brother, and entered as a pupil. What struck Keiller specially was that as soon as the new-comer was left to himself he sat down at the counter with a copy of Duncan's *Dispensatory*, and after studying it for a little, turned round and looked at the shelves, got up and took down some drug and read it up in the book, and then another and another, till his time was up, and the older hands saw that their companion was determined to carry out of that shop all that the big head could hold.

The friendship begun in the chemist's shop lasted unbroken throughout the lifetime of the two men. Keiller recognised Simpson's supremacy, and knew both how to help and to get help from his fellow-worker. Many of us must have heard him speak of an encounter he had with a brother obstetrician who had some "gumption" against Simpson and had ceased to attend the meetings of our Society. The confrère wished to persuade Keiller to desert it also, saying, "The Obstetrical Society is just Simpson's rake." But that to Keiller was one of the charms of the Society; he got the good of all that was raked together for discussion there, and was for many a year one of the most zealous contributors.

Already, during the seven years of his general practice in Dundee, he had taken special interest in cases of obstetric moment, notes of which he sent to his old fellow-student in Edinburgh. It was probably in acknowledgment of the record of cases of intra-uterine ichthyosis that he received from Simpson the following letter:—

"22 ALBANY STREET, EDINBURGH,
*4th November* 1843.

"MY DEAR DR KEILLER,—I ought long, long, long ago to have acknowledged your most splendid contribution. It is quite magnificent. The truth is, I have had a course of headaches, that took all pith of working out of me, beyond the daily drudge of visiting. I have been for a few days out of town, and have come home much better. I hesitated where to go when sent out of town, and was on the point of running to Dundee to see it and you, and the cases you have so well reported and sketched. I do not know how sufficiently to thank you. I am far too busy at present to think of writing up the paper, but will do so soon, and will be proud to acknowledge your zealous labours.

"Keep your eyes open, and do send something for our journals yourself. You have in you the power of doing much more than you suppose.—Yours very sincerely and gratefully,

"J. Y. SIMPSON."

The last sentence in that letter touches very tenderly the weak point in Dr Keiller's character and career. A certain diffidence or dilatoriness seemed to keep him back from giving complete records of his extensive observations, or bringing into full prominence and perfection his many fertile suggestions for improved forms of instruments or methods of treatment. It would take much time to run over a mere catalogue of all the communications he made to this Society and to enumerate the discussions in which he took a part. Perhaps his most important addition to our modes of treatment was in the application of the india-rubber air-bag for dilatation of the cervix uteri. It was on the 9th of March 1859 that he first made mention of the practice in the Society. The Minute-book, under the heading "On a New Mode

of Induction of Premature Labour, with New Mode of Dilating Os Uteri, etc.," says,—"Dr Keiller detailed at considerable length the case of Mrs F., upon whom on a previous occasion he had performed craniotomy. Drs Weir and Little were present at this labour, when Dr Keiller used an india-rubber pessary, with which he dilated the os uteri and retained the cord which was presenting. The patient was delivered of a female child alive. Dr Keiller stated that having been so successful he intended pursuing the subject further, as he saw no limit to its use in cases where dilatation or plugging were required." The report adds,—"Dr Weir spoke highly of this method from what he had seen in Mrs F.'s case." In the same year, on the 11th of May, Dr Keiller is found again making remarks on other cases of induction of premature labour, illustrative of the use of the uterine dilator, and exhibiting the different modes of operating. In such fragmentary fashion he was making his friends and fellow-members acquainted with the value of this important method of facilitating labour; but a more energetic member of the profession in London, working along the same line, succeeded in more rapidly improving the hydrostatic dilator and extending the knowledge of its virtues; so Keiller had to see "Barnes' bags" take the place in the hands of obstetric practitioners and in the text-books of obstetric students, that with a little more push he might have won for his own. In the department of gynecology a like fate befell an instrument which he described to us as a "uterine sound and cervical dilator, conjoined." Probably few of the younger Fellows have ever seen it or heard of its existence, for the Ellinger dilator and its modifications have entirely cast it into the shade. But Keiller's instrument has the principle of dilating the cervix by separation of the two halves of an implement that can be passed through the cervical canal, and before I had become acquainted with the more effective dilators, I have occasionally made use of it with satisfactory results in cases demanding the slighter degrees of dilatation.

But it was not only by his numerous communications to this and to the Medico-Chirurgical Society that Dr Keiller contributed to the advances made in his day to obstetrics and gynecology. After he had for three years tested his powers of exposition by conducting a course of lectures on Medical Jurisprudence—a department of Medicine allied at many points with our own, and one in which Dr Keiller was an acknowledged expert—he began in 1852 a long and honoured career as a lecturer on Midwifery at Surgeons' Hall. Many of the best of the Edinburgh students enjoyed the benefit of his prelections, and some who rose to eminence testified on the occasion of his candidature for the University Chair to the privilege they had felt it to have been his pupils, and to his well-known abilities as a painstaking and successful teacher. They got, like the members of our Society,

the good of his rich stores of clinical experience, of his ingenuity in suggesting better modes of treatment, and his inventiveness in contriving new instruments or improving older ones.

There is yet another service which Keiller rendered to the medical schools of Edinburgh that should be remembered to his credit. When, in 1851, he was appointed one of the Ordinary Physicians to the Royal Infirmary, the cases in his wards were of a miscellaneous character. Gradually, however, by an arrangement with his colleagues Dr W. T. Gairdner and Dr Warburton Begbie, all the more important cases of the diseases of women were put under his charge, till No. XVI. became almost a purely gynecological ward. There thus grew up under his care the gynecological department of the extra-mural course of clinical lectures which has since been so ably maintained by his successors Dr Matthews Duncan, Dr Angus Macdonald, and Dr Halliday Croom.

In the treatment of his patients in the ward he showed himself ever open to the advances that were being made in operative gynecology. In some directions, as we have seen, he devised fresh lines of treatment, and especially in the performance of plastic operations his dexterity and painstaking enabled him to achieve in many cases remarkable success. The results of his labours there and in the Maternity have enlivened so many of our meetings, and enriched so many pages of our Transactions, and he filled so well the various offices of Councillor, Secretary, Treasurer, Vice-president, and President in our Society, that I am sure I have your support in offering this tribute of respect to his memory, and in sympathizing with his widow and family in their sorrow for his loss.

Another name of yet wider renown disappears this year from the list of our Honorary Fellows. On the 14th of March, Carl Siegmund Franz Credé died full of years and of honour. Of French extraction, he was born in Berlin on 23rd December 1819. In the great University of the Prussian capital he received the greater part of his medical training, though he had spent one semester at Heidelberg, where he made the acquaintance of the illustrious Naegele. After graduating at the age of 22, he visited Vienna, Belgium, Italy, and France, and spent several months in Paris, attending the obstetric cliniques and giving special attention to cases of childbed fever. He used to tell that when he was making inquiries as to whether any means of curing or preventing puerperal fever had been found, he was staggered by the answer, "Do you still imagine, then, that there is a remedy for that disease?"

Happily for obstetrics there was no opening for service for the young doctor in Dieffenbach's surgical clinique at the time of his return to Berlin. Busch, however, the Professor of Midwifery, took him as his assistant, and for five years he worked in the same institution from which Hecker and Schultze and others of Germany's ablest obstetricians emerged. In 1849 he

obtained the qualification entitling him to deliver independent courses of lectures on midwifery. The young Privat-docent began with a class of four; but the numbers rapidly increased, and in 1852 he was appointed Director of the School for Midwives and Physicians in the Charité Hospital. Here he developed a gynecological department, for which his son-in-law, Professor Leopold, from whose *Gedächtnissrede*[1] I obtain details of his history, claims that it was the first in Europe to be devoted solely to the treatment of diseases of women and for clinical purposes. When I came upon that sentence in Leopold's touching address I felt sure that Credé's action in Berlin had been anticipated in Edinburgh, for I remembered that when I came here as a student in November 1850, my uncle had already a special ward in our Royal Infirmary under his charge; and on inquiring of Mr Trainer, the secretary of that Institution, he has kindly furnished me with the following:—

*Excerpt from Minutes of Meeting of Managers of the Royal Infirmary of Edinburgh, held on* 18*th February* 1850.

. . . . . .

"The Managers farther resolve:—

"1. That until the addition to the Medical House shall have been built, the clinical medical wards shall continue as at present to be wards Nos. 1, 2, 11 and 12, and that No. 2 shall be appropriated for diseases of the skin, and No. 12 for the diseases peculiar to women and infants.

"2. That the ward No. 12 shall be placed under the charge of the physician to be chosen by the Managers as aforesaid, who shall be entitled, and if called upon by the Managers shall be bound to deliver lectures on the cases under his care, but that no patient shall be placed in that ward until she has been made aware by the treasurer, superintendent, or matron, that she will be under the said physician, and may be more peculiarly the subject of attention to the lecturer and the students than she might be in a general ward. And, farther, that no children excepting infants shall be placed in that ward."

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*Excerpt from Minutes of Meeting of Managers of the Royal Infirmary of Edinburgh, held on* 11*th March* 1850.

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"The Managers then proceeded to the election of a physician to take charge of the treatment of diseases of women and infants, and on the motion of Dr Seller, seconded by Dr Pagan, Professor James Y. Simpson was appointed to the charge of the ward No. 12, subject to the regulations of the Hospital, and the provisions contained in the resolutions of the Managers of the 18th February last with reference to that ward.

[1] *Archiv für Gynækologie*, 1892, Bd. xlii. p. 198.

"The clerk was directed to communicate the appointment to the Medical Faculty of the University and to Professor Simpson, with a request that he will attend at next meeting of the Managers to take the oath *de fideli.*"

It was never found convenient to admit the infants referred to in the minute, so that if Leopold's claim for Credé holds good for the Continent, we must conclude that the Edinburgh Royal Infirmary was the first to set up a distinct gynecological department with provision for clinical instruction. It was fitting that this should occur in the city whose Provost and Town Council more than a century before had instituted the first of all the Professorships of Midwifery and the Diseases of Women.

In the summer of 1856, Credé went to Leipzig to fill the Chair of Midwifery vacant by the death of Jörg, where at the time of his appointment he had for colleagues the brothers Weber in Anatomy and Physiology, Günther in Surgery, and Wunderlich in Medicine. There the rest of his life was spent, and when he died he was the oldest of the medical professors in that famous University, and the Nestor, says Leopold, of German midwifery. It was in the early winter of the same year that I had the gratification of seeing him strenuously set to work in the development of his obstetrical and gynecological Institute, and the pleasure of a personal interview was renewed on the occasion of his brief visit to Edinburgh in 1873, with his friends Spiegelberg and Ploss, who both predeceased him.

Fritsch, in his obituary notice of Credé in the *Centralblatt* (June 2, 1892), lays stress on three important improvements in practice which make his name deserving of all honour. He was the first, Fritsch states, to introduce the cephalotribe into general use in Germany. Cephalotripsy was certainly an immense improvement on the methods of head-reduction previously in use, and by means of it maternal mortality was markedly reduced. To have improved the construction of the instrument and extended its sphere of application was to have rendered a very valuable service to obstetrics. It was one of the things that impressed me most deeply in German midwifery to find in all the different schools that all other forms of craniotomy had been discarded, and that the only question was as to the best variety of cephalotribe. Yet the reign of the cephalotribe was of comparatively short duration. For after Braun of Vienna had recognised the value of the cranioclast, which was first exhibited by Simpson at our Society, and had made his well-known modification in its construction, the use of it was rapidly superseding the use of the cephalotribe, when the whole area of head comminution began to be circumscribed, till it is now lessened almost to the vanishing point by improvements, on the one hand, in the construction of the forceps, and, on the other, in the modes of carrying out the Cæsarean operations.

In advances in both of these directions, Credé's pupils Leopold and Sänger have, under his encouragement, taken a notable part.

The change in practice with which the name of Credé was first and most familiarly associated concerns the management of the third stage of labour. In the *Klinische Vorträge ueber Geburtshülfe*, which he published before he left Berlin, and which is a mine of valuable observations on various obstetric subjects, he already points out the dangers of the then usual practice of furthering the escape of the placenta by traction on the cord, and insists on the necessity of abstaining from all such interference and securing the complete delivery by pressure on the uterus instead. This practice he further carried out after his removal to Leipzig, and by contributions to the obstetric section of the *Naturforrscher-versammlung*, and papers in the *Monatsschrift für Geburtskunde*, he succeeded in impressing the value of his procedure on the minds of his fellow-countrymen, until the *Credé'sche Verfahren* became the almost universally adopted method of management, to the lessening of the frequency of hæmorrhages in the third stage and post-partum, of inversions of the uterus, of retention of the placenta or placental fragments, and other risks that had attended previous lines of practice. No doubt the expression of the placenta by the abdominal grasp of the uterus was in many hands overdriven, the compression being carried out too speedily and too powerfully, with the result that new dangers arose, which led some German obstetricians a few years ago to resort, as with a pendulum swing, to the expectant line of practice, which leaves the expulsion of the placenta to the unaided action of the uterus and abdominal muscles, even though it lodged for hours in the genital canals or cavities. In the hands of Credé himself, however, and of those who were careful to attend to his precepts, the practice has proved eminently safe and salutary, and it is the kind of treatment expounded and enjoined to-day in all the leading text-books of midwifery. The disastrous results of traction on the cord were not so frequently witnessed in midwifery in this country, for Clarke of Dublin, in particular, had already enforced to some degree the necessity of conjoining pressure from above with traction from below, so that a line of practice closely resembling that commended by Credé is sometimes described as the Dublin method of delivery of the placenta. Still there was room among ourselves for improvement in the direction of abstinence from internal interference and appreciation of the value of external pressure; and I count it among the honours of my life to have had the privilege of explaining to this Society, nearly thirty years ago, Professor Credé's method and helping to give it its place in British practice. It is always to be borne in mind that it belongs to a general movement on the part of obstetricians to trust more and more to external manipulations both in diagnosis and treatment, and to have less and less recourse to all varieties of internal

interference; and the diminution of the danger of introduction of septic matter with the fingers or hands into vagina or uterus during labour is largely due to the initiative of Credé.

Perhaps an even more indisputable claim to lasting renown is to be found in his discovery of the means of preventing ophthalmia neonatorum. It was in 1881 that he published in the *Archiv für Gynœkologie* the results of his practice in a paper entitled "Die Verhütung der Augenentzündung der Neugeborenen," in which he showed that by washing the eyes of all the infants immediately after birth and introducing with a glass rod a drop of a solution of two per cent. of nitrate of silver, he had succeeded in banishing from the Leipzig Maternity a disease that a few years previously had attacked more than 13 per cent. of the infants, and that sometimes had eventuated in their total blindness. Our Transactions show that this important prophylactic measure was soon appreciated among us, and I am myself convinced, from the results of the experience of our own Maternity, that if ever infants suffer from a dangerous ophthalmia it is because the attendants at its birth failed to carry out the precepts of Professor Credé.

Whilst in these directions he laid the obstetric world at large under the deepest obligation, there were others in which he also rendered service of no little value. Such are his papers on the management of the puerperium and his suggestions for the use of an incubator for the rearing of premature infants, though in those matters Tarnier and others take precedence of him. But we must further bear in mind that in his editorial work in the *Monatsschrift für Geburtskunde*, and still more in the establishment in 1870 of the *Archiv für Gynäkologie*, which he edited at first along with Spiegelberg, and afterwards with Gusserow until the time of his decease, he contributed mightily to the development of every branch of midwifery and the diseases of women and children, and aided in the spread of the knowledge of all that was newest and best.

It is an honour to our Society to have had Credé's name for eight and twenty years on its list of Honorary Fellows, and with all the obstetric world we now lament his loss.

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*Dr Berry Hart* had much pleasure in moving a hearty vote of thanks to their President for his interesting address. Dr Keiller's death was a great loss to the Society, as his geniality and shrewdness made his remarks at their meetings always interesting and valuable. His courtesy and kindness to younger Fellows was specially marked, and quite in accordance with the best traditions of their Society. Professor Credé's death was a very great loss to obstetric science, and few men could expect to do as much for its practical advance as Credé had done for the third stage of labour and the prevention of congenital blindness.

## III. FURTHER CONTRIBUTIONS TO THE STUDY OF VERSION ON ONE LEG.

By Dr W. Nagel, Privat-docent of Midwifery and Gynæcology in the Royal University of Berlin. Communicated by Dr J. W. Ballantyne.

It is universally recognised—and here in Edinburgh, in especial, it is still fresh in men's memories—how largely the introduction of version on the further leg was due to Sir James Simpson; and his exposition of the advantages of the upper leg in difficult cases of turning was so striking that, to this day, many distinguished accoucheurs think it correct to turn by the further leg only. Meanwhile, however, opposition to this practice has not been wanting. Galabin of London, more especially among later writers, has set forth with great acumen the advantages offered by seizing the lower leg;[1] and it must now surely be regarded as a fact that it is a matter of indifference which leg is taken, as far as the turning of the fœtus in the uterus is concerned. The results of theoretical considerations, experiments upon the phantom, and the clinical experiences of late years, all agree in demonstrating that the conversion of the transverse into the longitudinal presentation can be performed as satisfactorily with the lower leg as with the upper—a conclusion I can support from my own clinical experience, obtained in ninety-four cases of transverse presentation, in nineteen of which the membranes were intact at the time of version, and nine of which were in connexion with placenta prævia.

Every experienced accoucheur, however, will doubtless have now and again met with a case in which strong pains have pressed the presenting shoulder far into the pelvis, and in which the turning of the fœtus, no matter which leg is seized first, cannot be accomplished till both legs have been brought down. Of recent years, G. E. Herman[2] has described three cases where strong contraction of the lower uterine segment was an obstacle to the turning of the fœtus, even after both legs were brought down. I myself met with a pronounced case of this kind in Berlin some months ago; and as it gives an illustration of the condition described by Herman in a more advanced stage, I should like to communicate it here—inasmuch, as also pointed out by Galabin and Champneys,[3] as an extrusion of the lower uterine segment as a hindrance to version in *transverse* presentation is of very rare occurrence now-a-days. My case was that of a multipara, 41 years of age, at full term, where the right arm had fallen forward simultaneously with

[1] A. L. Galabin, "On the Choice of the Leg which should be Seized in Version for Presentation of the Upper Extremity," *Transactions of the Obstetrical Society of London*, vol. xix., 1877, p. 239.

[2] G. E. Herman (London), "Note on One of the Causes of Difficulty in Turning, with Remarks on the Practice of Amputating the Procident Arm," *Transactions of the Obstetrical Society of London*, vol. xxviii., 1886, p. 156.

[3] *Trans. of the Obst. Soc. of London*, vol. xxviii., 1886, p. 153.

the escape of the waters; very violent pains began immediately, following one close upon another, and passing forthwith into strong pressing down pains. It was night, and the distance was considerable, so that the midwife's message did not reach me till four hours after the escape of the waters. I hastened to the patient at once, and found her undergoing very violent pains, the temperature normal, and her pulse 76–80. The ring of contraction was very strongly marked, so that it could be seen and felt at the height of the navel; the fœtus lay in the markedly distended lower uterine segment, as could plainly be seen (after the patient had been put under chloroform) through the thin walls of the abdomen, and be ascertained on merely external examination; the corpus uteri lay up to the right like a hemisphere upon the distended uterine segment; the prolapsed arm was born up to the shoulder; immediately behind the introitus vaginæ lay the thorax; the head on the right iliac bone; the back posteriorly. Having assured myself that the child was dead, I did not attempt version, on account of the threatening symptoms with regard to the uterus, but decapitated the child, after which successful delivery easily followed. The puerperium was quite normal.

A number of eminent accoucheurs, both in former and recent times (Baudeloque, Lachapelle, Hohl, Gusserow, and others), did not regard the choice of the leg from the point of getting the most favourable handle for turning the fœtus, but took that leg which came in front behind the symphysis immediately after version; for they took into account the well-known fact that the delivery of a mature child in incomplete foot-presentation can only proceed without assistance when the leg outstretched lies in front behind the symphysis. In consequence of this consideration, the above-mentioned authors chose the upper leg in dorso-posterior positions, and the lower one in dorso-anterior.

Galabin[1] and Fritsch[2] are of opinion, however, that in the dorso-posterior positions, when the further leg is taken, the back of the fœtus remains in many cases posterior; in other words, that the leg which is brought down immediately after the completion of version does not lie in front behind the symphysis, but has to turn then in that direction, so that the advantage aimed at is completely lost. Fritsch, however, is only speaking of the back, and not of the legs; he does not tell where the leg, which was taken, was lying after version in his seventeen cases—whether it was lying in front behind the symphysis, or in the hollow of the os sacrum. Galabin also is speaking of the back, and does not mention the position of the leg that is down. I suppose, however, that the two authors, in giving the position of the back, intend at the same time to state the position of the leg that is down; then it is,

[1] Galabin, *ut supra*.

[2] Fritsch, "Zur Lehre vom Ergreifen der Füsse bei der Wendung," *Archiv f. Gynäkologie*, Bd. iv.

I think, quite indifferent that the back is posterior after version, if not at the same time the leg, which is taken and now outstretched, is situated in the hollow of the sacrum.

Fritsch and Galabin support their view by their clinical experience, and there cannot be any doubt as to the accuracy of the observations of these practised observers. I may, however, claim the same right with regard to the exactness of my own observations; and these contradict the assertions of the two observers. In nineteen cases of dorso-posterior presentation, in which, in accordance with Gusserow's precepts, I took the further leg, this leg came without exception in front behind the symphysis after version, and there remained. The fact that Galabin's and Fritsch's observations are absolutely contradictory to mine is not easy to explain; I think, however, that the exposition Galabin gives may be very aptly employed to this end. Galabin says (*ut supra*, p. 246),—"In abdomino-anterior positions, however, the pubes allows but scanty space for the hand to be bent backwards round the sharp angle at the concave side of the pelvic curve. Hence the hand naturally deviates more or less to one side, and traction is not directed sufficiently forward with regard to the pelvis and the fœtus. At the same time, by its lateral deviation, it tends to rotate the fœtus about its antero-posterior axis."

To this explanation I should merely like to add, by way of complement, that it is especially good for the cases where, in the conditions supposed, the breech lies *deep* near the os: in such cases I think it may most frequently be observed—though I myself have not hitherto met with it—that the leg which is taken, even though it be the further one, simply glides down sideways on being drawn forth, without that rotation of the fœtus about the longitudinal axis which is aimed at. But, on the other hand, if the breech is situated *high* (in the fundus uteri), the mechanical process of turning will resemble that in head presentation, *i.e.*, will exhibit a rotation over the abdominal surface of the fœtus about the transverse (bilateral) diameter of the fœtal trunk, and the further leg (that opposite to the presenting shoulder) will lie in front behind the symphysis immediately after the version is completed. A further reason for the result in my cases may exist in the fact that I placed the patients—following Gusserow's precepts—on the side at which the legs lie, and if they lie to the right, introduce the left hand into the uterus, and conversely. In this position it may be easier to draw the leg forward during the version, and thus rotate the fœtus about its longitudinal axis.

In the majority of cases of *dorso-anterior* position, the lower leg will lie in front behind the symphysis immediately after the version is accomplished. An exception to this is formed, however, by those dorso-anterior positions in which the breech is situated in the fundus, and the mechanical process in turning the fœtus resembles that employed in head presentation. In such cases—as I have

observed on the living subject, and as, moreover, any one may easily convince himself of with the phantom—it will often be found, on taking the leg that corresponds to the presenting shoulder, that this leg lies at the back, after version, in the hollow of the os sacrum, and must therefore now rotate to the front. Take, for example, a first dorso-anterior transverse position. In such a case, if the breech lies *deep* near the os uteri, the lower leg when taken will come immediately behind the symphysis; but should the breech, in the position supposed, be situated *high* in the fundus (and this not infrequently happens in practice), then, having regard to the origin of the position, we must consider it as a second head presentation, in which the head has been diverted so far to the left that the shoulder, and not the head, constitutes the presenting part; as in the second head presentation, the breech in the case supposed is situated high to the right in front, the legs high to the left behind. If now from the second head presentation we desire to turn in such a way that the leg which is taken shall come in front behind the symphysis after version, we must bring down the *left* leg; in the case we take, however, if we regard it as a transverse presentation—and this, from a practical standpoint, we are bound to do—the *left* leg is the *further* one. If the operator, as I have done in practice, draws this further leg down, it will come in front behind the symphysis after the completion of version, the mechanical process being analogous to that in the second head presentation. If, on the other hand, the operator follow the rule that in dorso-anterior transverse positions the *lower* leg (*i.e.*, the one corresponding to the presenting shoulder) is to be chosen, and therefore grasps the right leg, he will find in the case we take—as I have found in practice (see Case No. 23, *cp.* Case No. 29), and as others must certainly have done—that the leg he has taken (here the right) will be found posteriorly immediately after version in the hollow of the os sacrum, since the fœtus, on the drawing down of the leg, has turned in a fashion analogous to that in the second head presentation.

Whether, in the case here taken, the turning of the fœtus will happen in the manner just described, or in such a way that the leg which is grasped (the lower one) will come under the symphysis immediately after version will depend, in my opinion, partly upon the flexibility of the fœtus, partly upon the degree of contraction of the uterus about the fœtal trunk. Galabin, in the work referred to, searchingly investigated the importance of the first-named factor with regard to the turning round of the fœtus, and it is clear that in dorso-anterior positions, with the breech situated in the fundus, that the lower leg (*i.e.*, the one which corresponds to the presenting shoulder) can only be drawn forward along the lateral uterine wall towards the symphysis pubis, when the flexibility of the trunk is such that it can be to a certain extent doubled up, so to speak, over its right or left side. Now, this degree of flexibility will be

especially induced when the tonus of the body is suspended, and therefore when the child is dead or in danger of death. It is, moreover, evident that this last-named species of turning requires more space than that described above. On the basis of this analysis, which tallies with my observations on the living subject, I come to the conclusion that in dorso-anterior positions, with the breech situated high, it is by no means to be taken as a fixed rule, that the lower leg (*i.e.*, the one corresponding to the presenting shoulder) lies in front behind the symphysis immediately after version. In all cases of version on the *further* leg in dorso-anterior positions, *except in the case just mentioned*, the back will, in the first place, lie posterior immediately after the version is completed; and here my clinical observations tally with those of Fritsch and Galabin, for in the cases of dorso-anterior position in which I performed the version by means of the upper leg, according to the precepts of Barnes, the leg which was brought down, and consequently the back as well, lay after the version in the hollow of the os sacrum. If, in *dorso-posterior* positions, the lower leg (*i.e.*, the one corresponding to the presenting shoulder) is turned, then, after the version, this leg will similarly lie back, as a rule, in the concavity of the os sacrum. In my cases of version of the last-named class I have never seen an exception to this rule; and, indeed, an exception is only possible when there has taken place within the uterus and during the version that rotation about the longitudinal axis of the fœtal trunk which otherwise always occurs at a later stage of birth, viz., after the performance of the foot presentation. I regret that Galabin has not mentioned this in his excellent work, since this is one of the chief objections of many accoucheurs to the seizing of the lower leg in the dorso-posterior position. It is, of course, perfectly true that the leg brought down, even in such cases, will *finally* be the anterior one; and on this circumstance Galabin justly bases his advice—advice also given by Gusserow and others—to place a noose upon the prolapsed arm, so that there may be no difficulty with the release of the anterior arm in the subsequent extraction; but *first* the fœtal trunk must make the rotation about its longitudinal axis discussed below.

It is now a universally recognised fact—a fact brought into prominence, especially by Wigand and by Braxton Hicks[1]—that the fœtus in most cases of so-called transverse presentation lies obliquely, and not transversely, either the head or the breech being nearer the os. Which part lies deep, and which mechanical process in the turning is to prevail in a given case, must depend—I would wish to emphasize this—upon the original position (head or breech presentation) from which the oblique position has arisen; and it is evident that, after versions made under the above-mentioned circumstances—especially when the

[1] Braxton Hicks, *On Combined External and Internal Version.* London, 1886.

further leg is taken in the dorso-anterior position, and the nearer one in the dorso-posterior—the operator will often find an incomplete foot presentation with the *posterior* leg prolapsed. Now, as the child cannot be born in this position—I disregard here immature and macerated fœtuses—the question arises, What next is to be done?

It is a fact, as I have mentioned above, that the leg which is brought down, even though it at first lies back in the cavity of the os sacrum, finally rotates to the front in the course of labour after a longer or shorter interval. But of *the way* in which this rotation takes place, and of *the methods* by which it may be eventually assisted, we get no serviceable exposition, as I have before stated,[1] either in the text-books or in original works on this subject. I admit that in practice this question is often of subordinate importance. But it must be the task of a rational science of midwifery to gain the most accurate knowledge possible of the individual processes which are gone through in natural labour, in order that the way taken by Nature may be followed when help is necessary. For even though one holds fast, as I always do, to the rule to wait for the pains of birth after version, and let Nature, gently assisted, complete the delivery, there will yet be cases in every accoucheur's experience where delivery must be accelerated as much as possible.

My observations, therefore, have had as their object to set forth the manner and way in which the fœtal trunk rotates about its longitudinal axis in incomplete leg presentation with prolapsed posterior leg, in order that this prolapsed leg may come in front behind the symphysis; and I believe, for the reasons just mentioned, that this may claim a certain share of interest from members of the profession. The cases all come from the Obstetric Polyclinic of the Royal Charité in Berlin, which I formerly superintended as Assistant-Physician; and my thanks are due to Professor Gusserow for granting me the material.

I bring forward over thirty cases of this kind, in which either I found the posterior leg prolapsed, or where, for various reasons, I brought down the posterior leg, and of which I made accurate notes during and after the delivery. In twenty-four of these I was present at the completion of the delivery, and saw the actual rotation; six times I was unable to do this, and in these six cases the rotation was observed by the obstetric clerk. I lay stress on the fact that in all cases the delivery was left to Nature after version was performed, so that the rotation here observed thus represents a natural process. Whenever in the later course of the delivery a pull was given to the leg, this is mentioned each time in the account of the case (see below). In ten cases I had to deal with placenta prævia, which I handled according to Braxton Hicks' method, effecting combined version as speedily as possible, and

[1] W. Nagel, "Zur Lehre von der Wendung auf einen Fuss," *Archiv für Gynäkologie*, Band xxxix., 1891.

then leaving the extrusion of the child to the pains; in these cases, to stop the flow of blood, a pull was given (by means of a noose) to the outstretched leg, the pull being only such as could be produced by the weight of the arm alone; and I do not think that so moderate a pull could influence the natural process of the rotation.

In the whole of the thirty cases *the rotation of the fœtal trunk about its longitudinal axis took place in such a way that the back glided past the promontorium;* the leg which at first lay back in the os sacrum cavity therefore *always* passed over *the longer way* through the pelvis, in order to get in front behind the symphysis—*never* the shorter way through that half of the pelvis in which the back was immediately after version. I would remark here, that all the patients after version was completed were put into the dorsal position, and that the deliveries were accomplished in this position; whether the side position can exercise any influence over the rotation of the fœtus I have not investigated. From my observations, I conclude that the manner of rotation referred to is *probably the only one in accordance with Nature* in cases of incomplete foot presentation with prolapsed posterior leg. If labours of that sort are left to Nature, the pains will always expel the fœtal trunk with the rotation above set forth.

The fact that I have only once met with a distortion of the fœtus also speaks in favour of my hypothesis. In this case (No. 8) the anterior arm was pressed into the neck, and as I had to deal here at the same time with a weakly pulsating prolapsed umbilical cord, which compelled me to hasten the delivery in spite of an insufficiently dilated os, it must be left doubtful whether this was not the cause of the abnormal position of the arm.

Berry Hart has lately written a paper on Internal Rotation,[1] and he says,—"Whatever part of the fœtal head or trunk first strikes a lateral half or lateral part of the sacral segment is rotated internally to the front, and in the direction opposite to the lateral half or lateral part of the segment so acting." Berry Hart does not at all mention the incomplete foot presentation with prolapsed posterior leg, and in his diagrams of rotation I miss the method through the posterior half of the pelvis past the promontorium which I point out. I do not think that the law of rotation given by Berry Hart is right in the above-mentioned foot-presentation.

An explanation of the somewhat remarkable manner of rotation may be as follows: Through the pressure of the pains being directed downwards and backwards the leading part (*i.e.*, the prolapsed leg and the corresponding half of the breech) moves in the direction where the pelvis offers most room, and consequently least resistance, *i.e.*, in the os sacrum cavity; the scanty space in the antero-lateral part interposes an insuperable obstacle in usual cases (I disregard here immature fœtuses) to the rotation of the back by the

[1] Berry Hart, "On the Nature and Cause of the Movement of Internal Rotation," *Edinburgh Medical Journal* for May 1886.

shorter way to the symphysis, *i.e.*, through the corresponding half of the pelvis. At the same time as this rotation occurs the leading half-breech, now lying posteriorly, goes *deeper;* the anterior leg, which is bent upwards, finding now resistance in the anterior wall of the pelvis, will force a way, on its part, into the os sacrum cavity: as is universally admitted, the prolapsed, posteriorly-situated leg rotates in consequence to the front till the greatest diameter of the breech sinks into the antero-posterior diameter of outlet of the pelvis. The only exception I have met with to the mechanism of labour here described was in a case of *placenta prævia* in the seventh month of pregnancy, in which I had brought about by combined version an incomplete foot presentation with the posterior leg outstretched; in order to stop the bleeding, something more powerful than usual had to be applied to the leg of the immature fœtus. The rotation did not take place in this case, as the fœtus, after the os was sufficiently dilated, was extracted in the position mentioned. In premature labour the absence of the rotation will be observed somewhat frequently, but this does not militate against the validity of the sentence enunciated above.

I should like to sum up the results gained from my observations in the following sentences:—

It is a matter of absolute indifference which leg is seized in order to accomplish the turning of the fœtus in utero.

If it is intended that the leg which is brought down and outstretched shall lie in front behind the symphysis immediately after version, this result will be attained in the majority of cases when the lower leg (*cp.*, however, p. 17) is brought down in dorso-anterior positions, and when the upper one is brought down (but see p. 16) in dorso-posterior positions.

If, however, there has been produced, through the version, an incomplete foot presentation with the posterior leg outstretched, then this latter will rotate to the front in such a way that the back of the fœtus glides past the promontory.

If it is found necessary in cases of the last kind to complete the delivery, the artificial rotation of the fœtal trunk about its longitudinal axis, so that the outstretched leg comes in front, should be done in the direction indicated above.

To illustrate the observed facts I give here some of the cases; the first eighteen observations have been published in the *Archiv für Gynäkologie*, vol. xxxi., Berlin, 1891.

CASE XX., 28*th of October* 1891.—W., 33 years of age, iv.-para; twins; first child naturally born in head presentation; second child was situated in second incomplete foot-presentation (the back to the right) with prolapsed presenting posterior (left) leg. I ruptured the membranes; the procident leg fell at once down into the hollow of the os sacrum, and under strong pains the fœtal trunk rotated from the right into the left half of the pelvic

cavity with the back gliding past the promontorium, so that the prolapsed (left) leg came in front behind the symphysis; the mature living child was naturally born in the first complete foot-presentation.

CASE XXI., *3rd of December* 1891.—H., 31 years of age, iii.-para. Liquor amnii escaped thirty-six hours ago, when os incompletely dilated; first breech-position (back to the left). On my arrival I found the breech still at the pelvic brim, and I brought down the posterior (right) leg, which after that was situated in the hollow of the os sacrum. When strong pains came on, the fœtal trunk rotated from the left into the right half of the pelvic cavity with the back gliding past the promontorium, so that the leg down came in front behind the symphysis; as soon as the breech was born I extracted the child with difficulty, caused by the narrow pelvis and the large child (length 55 ctms., circumference of the head 38 ctms.), which was still-born.

CASE XXII., *12th of December* 1891.—S., vii.-para, second breech-position (back to the right). Placenta prævia centralis; os dilated to the size of florin. Severe hæmorrhage. I perforated the placenta with two fingers and brought down the posterior (left) leg, which then was situated in the hollow of the os sacrum and fixed by means of a noose, to stop the bleeding. When pains came on the fœtal trunk rotated from the right into the left half of the pelvic cavity with the back gliding past the promontorium, so that the outstretched leg came in front behind the symphysis. Six hours later the mature child was naturally born in the first incomplete foot-presentation; child still-born.

CASE XXIII., *20th of December* 1891.—G., 29 years of age, iii.-para; first dorso-anterior transverse position (head to the left, breech in fundus, feet in fundus to the left behind) with procident right arm. I placed a noose round the procident arm and brought down the right leg, which after version was situated posteriorly in the hollow of the os sacrum, the back posteriorly to the left. When pains came on the fœtal trunk rotated, on pulling slightly on the prolapsed leg, from the left into the right half of the pelvic cavity with the back gliding past the promontorium, so that the outstretched leg came in front behind the symphysis. Strong pains expelled the living child (length 48 ctms., circumference of the head 33½ ctms.) in the second incomplete foot-presentation.

CASE XXIV., *5th of January* 1892.—G., 27 years of age, iv.-para. Twins, first child in second breech-position (back to the right); os dilated to the size of a crown; membranes ruptured six hours ago. I found that the breech had not entered the upper strait of the pelvis, and brought down the left leg, which then was situated posteriorly

in the hollow of the os sacrum. When pains came on, the fœtal trunk rotated from the right into the left half of the pelvic cavity with the back gliding past the promontorium, so that the outstretched (left) leg came in front behind the symphysis, and the mature, well-developed living child was born in the first incomplete foot-presentation.

CASE XXV., *6th of January* 1892.—S., 27 years of age, iv.-para; ninth month of pregnancy; first transverse position; os dilated to the size of half a crown; placenta prævia centralis; profuse hæmorrhage. Bipolar version after Braxton Hicks' method, whilst I pushed two fingers through the placenta near its border and brought down the left leg, which after version was situated posteriorly in the hollow of the os sacrum, the back to the right; the prolapsed leg was fixed by means of a noose to stop bleeding. Under good pains the fœtal trunk rotated from the right into the left half of the pelvic cavity with the back gliding past the promontorium, so that the prolapsed leg (the left) came in front behind the symphysis, and the child was expelled two hours later in first complete foot-presentation; child still-born.

CASE XXVI., *16th of January* 1892.—A., 34 years of age, vi.-para; ninth month of pregnancy; severe bleeding for two hours; first head position (O.L.A.); os dilated to the size of a florin; placenta prævia lateralis dextra. Bipolar version after Braxton Hicks' method, whilst I ruptured the membranes and brought down that leg I first reached; it was the left, and after version it was situated posteriorly in the hollow of the os sacrum, the back to the right; the prolapsed leg was fixed by means of a noose to stop bleeding. The fœtal trunk rotated under strong pains from the right into the left half of the pelvic cavity with the back gliding past the promontorium, so that the prolapsed leg came in front behind the symphysis; the living child was born naturally two hours later in the first incomplete foot-presentation.

CASE XXVII., *19th of January* 1892.—M., 32 years of age, i.-para. Pains began thirty hours ago. Liquor amnii escaped twelve hours ago; first breech-position (back to the left). In spite of strong pains the breech did not enter the narrow pelvis (spinæ ilii 24, cristæ 25, conjugata externa 17½ ctms.), contraction-ring four fingers above the symphysis. Fœtal heart 180, os fully dilated. I brought down the right leg, which then was situated posteriorly in the hollow of the os sacrum. Under strong pains the fœtal trunk rotated from the left into the right half of the pelvic cavity, so that the (right) procident leg came in front behind the symphysis; the fœtus was then situated in the second incomplete foot-presentation. Since the child was in danger (fœtal heart now 90) I extracted it; from the narrow pelvis the dis-

engaging of the posterior arm was very difficult, and the head was brought through the pelvis by means of energetic pressure from above, and delivered by Mauriceau-Veit's manipulation. The much asphyxiated child (length 49, circumference of the head 34½ ctms.) was resuscitated. A rupture of the perineum nearly to the anus, second degree, was sewn up with silk.

CASE XXVIII., *4th of February* 1892.—N., 32 years of age, vi.-para; pregnant, in the beginning of the eighth month. Severe bleeding for three hours, first breech-position (back to the left); os dilated to the size of a crown; placenta cannot be felt. I ruptured the membranes and brought down the right leg, which then was situated posteriorly in the hollow of the os sacrum. Under a strong pain and under simultaneous pressure upon the fundus the fœtal trunk rotated from the left into the right half of the pelvic cavity with the back gliding past the promontorium, so that the prolapsed leg came in front behind the symphysis. The extraction of the still-born child (length 38½, circumference of the head 27 ctms.) in the second incomplete foot-presentation was very easy. The placenta followed immediately; the third part of its surface was covered with blood-clots; the gap in the membranes was near the border of the placenta.

CASE XXIX., *6th of February* 1892.—H., 32 years of age, iv.-para; pendulous abdomen. Liquor amnii escaped eight hours ago. Fœtal heart 136; os fully dilated; left shoulder presenting, back anterior, head on the right os ilii, breech in the fundus to the left, feet in fundus to the right behind. I brought down the left leg (corresponding to the presenting shoulder); immediately after version the procident leg was situated posteriorly in the hollow of the os sacrum, the back posteriorly to the right. When strong pains came on the fœtal trunk rotated from the right into the left half of the pelvic cavity with the back gliding past the promontorium, so that the outstretched prolapsed leg (the left) came in front behind the symphysis; extraction in the first incomplete foot-presentation; the left arm protruded into the vagina in taking down the leg and was before version placed in a noose. The large child (length 53½, circumference of the head 36½ ctms.) was asphyxiated, but was resuscitated.

CASE XXX., *7th of February* 1892.—F., 27 years of age, iii.-para; eighth month of pregnancy; first transverse position; slight bleeding during the last six days; os dilated to the size of a florin. Placenta prævia centralis. I performed bipolar version after Braxton Hicks' method, whilst I perforated the placenta near its border and brought down the left leg, which after version was situated posteriorly in the hollow of the os sacrum, the back to the right; to prevent bleeding, the prolapsed leg was fixed by means of a noose.

When pains came on the fœtal trunk rotated from the right into the left half of the pelvic cavity with the back gliding past the promontorium, so that the prolapsed leg came in front behind the symphysis. Four hours later the living child was born naturally in the first incomplete foot-presentation.

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*The President* observed that Dr Nagel had laid the Society under a deep obligation by the paper which had just been read. It was of great value both in its scientific and practical aspects, and was an excellent example of the instructive kind of work we were accustomed to look for from our German colleagues. He (the President) was glad to have his own impressions confirmed that turning can be accomplished with equal facility whichever leg was laid hold of. It was extremely interesting to have had the exposition of the mode of delivery of the fœtus in breech presentations with the posterior limb prolapsed, and the result of Dr Nagel's contribution would be to render all our teaching and our practice more definite. It gave promise of a successful session to have it initiated with such an admirable essay.

*Dr Berry Hart* had listened with great pleasure to Dr Nagel's paper, and would study it carefully.

*Dr W. Nagel* said that he felt very grateful to the President and the Society for the kind hearing given to his paper; he also thanked the Secretary, Dr Ballantyne, very sincerely for communicating his paper. He wished to emphasize that it was the manner of rotation of the fœtus with the back gliding past the promontory, which he had observed constantly in his cases of incomplete foot-presentation with prolapsed posterior leg, and his conclusions from this fact to the study of version on one leg, which he considered as the chief points in his paper. To Dr James Ritchie Dr Nagel replied that he often had to deal with narrow pelves in his above-mentioned cases of transverse presentations, and that he was sure that the narrow pelvis in many of these cases was the cause of the transverse presentation.

## IV. PLACENTA PRÆVIA.[1]

By Dr Berry Hart, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Midwifery and Diseases of Women, Surgeons' Hall; Physician, Royal Maternity and Simpson Memorial Hospital; Assistant Gynæcological Physician, Royal Infirmary, Edinburgh; Examiner in Midwifery, University of Edinburgh.

Mr President and Gentlemen,—It needs no words of mine to picture to you the importance to human life of placenta prævia. In a complication where the lives of both mother and child are so seriously threatened there is certainly occasion enough for the most serious attention of all in our branch of the profession;

[1] Given as the opening of a discussion on Placenta Prævia at the International Congress of Gynæcology and Obstetrics, held at Brussels, Sept. 1892.

and such attention and mutual comparison of our international knowledge will, I rest assured, not be wanting at our Congress to-day.

In bringing such a subject before you, my first thought is, "How best to do it?" Surely, by considering what facts we really know, and what treatment these facts indicate.

At the very threshold of our subject, then, we are met with the question—

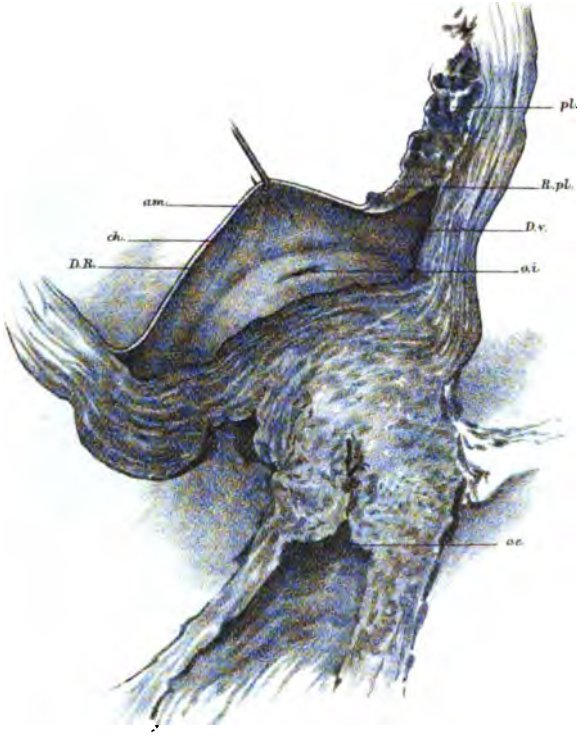
WHAT IS PLACENTA PRÆVIA? Placenta prævia may be defined as the attachment of part of the placenta within a certain distance from the os internum, or its attachment to that part of the uterus proper (*i.e.*, the uterus excluding the cervical canal) which becomes stretched and expanded during labour. These definitions require some explanation, and we take the second or functional definition first for a special reason.

The results of the frozen sectional anatomy of women who have died in labour have shown us that the uterus proper is divided into two markedly contrasted portions by the retraction ring. All above the retraction ring is active during labour, while a certain portion of the developed canal below this ring is the passively dilated lower uterine segment. Where the lower limit of this meets the upper limit of the cervical canal it is difficult to say, although Chiari's section gives some help in settling this question by the upper limits of the arbor vitæ.

In post-partum uteri of the first 12 hours we can note distinctly that the passively stretched portion below the retraction ring is divided almost equally between lower uterine segment and cervical canal. We can thus define placenta prævia as *the attachment of part of the placenta such that it lies on a part of the uterine wall proper whose upper boundary during labour is the retraction ring.* As this part becomes expanded during labour, this is merely the old definition of Rigby expressed in terms of modern anatomy.

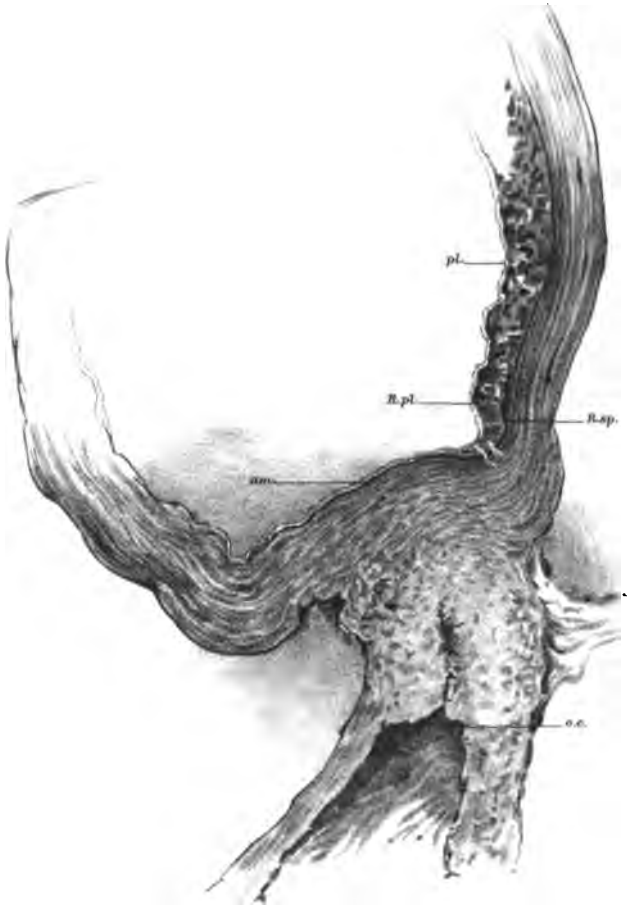
We have now, however, to face a more difficult question, viz., "What portion of the uterus at the end of pregnancy corresponds to the part of the uterus which during labour is bounded above by the retraction ring?" The answer is, "the lower uterine segment," and I have now to define this important portion of the full-time pregnant uterus. The lower uterine segment is a hemispheroidal portion of the uterus with the os internum as its lowest point, and its upper limit about 2½–3½ inches along the walls from that. The characteristics of the lower uterine segment are usually given as—(1), looseness of its peritoneal covering; (2), separability of its lamellæ; (3), presence of a vein at the upper margin; (4), greater thinness as compared with the upper portion of the uterine wall.

None of these distinctions is satisfactory in every case. The looseness of peritoneum is best marked in front, not so well behind; the upper limit varies, and the vein is not always present behind, and sometimes not in front. For practical purposes

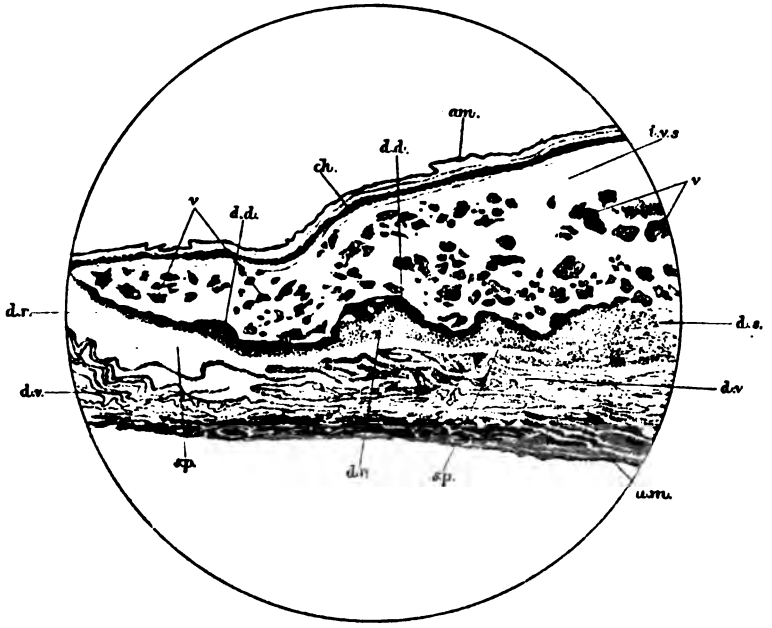



**Cervix and Lower Part of Uterus (4th month); Reflexa and Amnion hooked up to show Reflexar Placenta.**

***o.e.*, Os externum ; *o.i.*, Os internum ; *R.pl.*, Reflexa placenta ; *pl.*, Placenta ; *am.*, Amnion ; *ch.*, Chorion ; *D.R.*, Decidua reflexa ; *D.v.*, Decidua vera.**



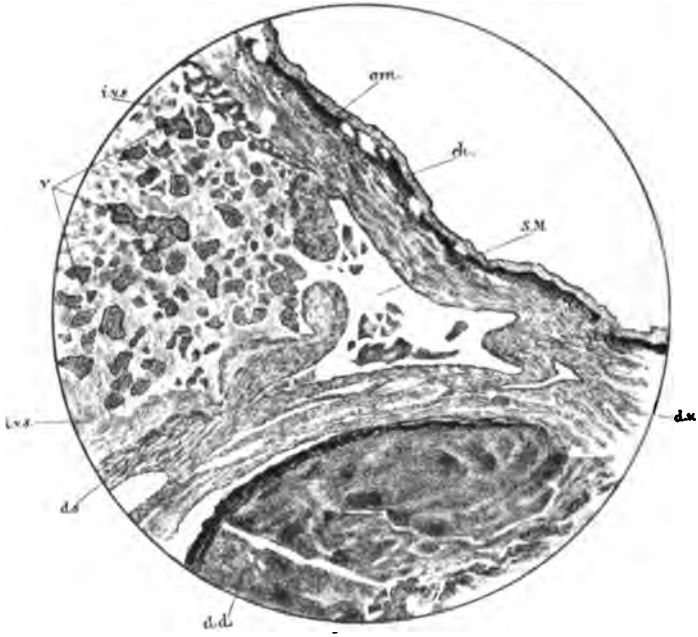

*o.e.*, Os externum; *R.pl.*, Reflexa placenta; *pl.*, Placenta; *am.*, Amnion; *R.sp.*, Linear space between reflexa and vera.




SECTION THROUGH THE PLACENTA, DECIDUA REFLEXA, AND DECIDUA VERA, AT THE LOWER MARGIN OF THE PLACENTA OF A FOUR MONTHS' HUMAN PREGNANCY, to show the degeneration of the reflexa. *am.*, Amnion; *ch.*, Chorion; *v*, Villus; *i.v.s.*, Intervillous space; *d.v.*, Decidua vera; *d.s.*, Decidua serotina; *d.r.*, Decidua reflexa; *d.d.*, Degenerated decidua; *u.m.*, Uterine muscle; *sp.*, Space between the decidua reflexa and decidua vera.

VERTICAL MESIAL SECTION OF CERVIX AND LOWER UTERINE SEGMENT OF A FOUR MONTHS' PREGNANCY, with edge of placenta low down (¼). *Pl.*, Placenta; *d.v.*, Decidua vera thickened; *o.i.*, Os internum.

SECTION THROUGH THE EDGE OF THE PLACENTA AND DECIDUÆ IN A FOUR MONTHS' HUMAN PREGNANCY. *d.v.c.*, Compact layer of the decidua vera; *d.v.s.*, Spongy layer of the decidua vera; *d.d.*, Degenerated decidua; *v.*, Villus; *d.r.*, Decidua reflexa. (Specimen from preceding Fig.)




SECTION THROUGH THE EDGE OF THE PLACENTA AND DECIDUA OF A SIX MONTHS' HUMAN PREGNANCY. *S.M.* Sinus of Meckel into which villi project; *am.*, Amnion; *ch.*, Chorion; *v.*, Villus; *i.v.s.*, Intervillous space; *d.v.*, Decidua vera; *d.s.*, Decidua serotina; *d.d.*, Degenerated decidua.

we can accept, however, this hemispheroidal portion of the uterus as a special segment, and thus get the shortest and best definition of placenta prævia, viz., "insertion of part of the placenta in more or less of the lower uterine segment."

Recently, Hofmeier has published an account of a four months' pregnant uterus with apparent placenta prævia, where the prævial part of the placenta was developed over the reflexa which had not yet become adherent to the vera. Kaltenbach has proposed, indeed, a definition of placenta prævia based on Hofmeier's specimen and others described by himself, viz., that the placenta is prævia when inserted over the lower pole of the reflexa. This definition has indeed been accepted by Olshausen in the last edition of Schroeder's well-known *Text-Book of Midwifery* (eighth edition), so that the new view has the support of those whose opinion carries great weight.

This raises an important practical question, and also one of great scientific interest. No early ovum has been found without the reflexa covering it. The reflexa is practically an extension of the serotina over the ovum, and its edges in early pregnancy are thick and with many villi attached. In a specimen of a six weeks' pregnancy, which I examined carefully with the help of my assistant Dr Lovell Gulland, the reflexa is about $\frac{1}{8}$th inch at its junction with the serotina, and gradually thins as it passes up from this point to about $\frac{1}{10}$th. In many specimens of two months' pregnancy the villi have been found well developed over the lower pole of the reflexa (Hofmeier, Kaltenbach), while in a specimen of a four months' pregnancy, of which I show a Drawing, the placenta was still quite evident over the lower end of the reflexa. I may briefly state here the view I take of the reflexa. I consider the human ovum as an embedded one—one implanted in the decidua,—the decidua serotina thus consisting of a deep portion next the uterine wall and a superficial portion, the decidua reflexa. This embedding of the pregnant ovum is found only in mammals high in the scale, *e.g.*, in the Insectivora. In the hedgehog, for instance, Hubrecht has shown that the impregnated ovum when it comes in contact with the serotina or tropho-spongia, apparently destroys the epithelium and is soon sunk into the tropho-spongia, which then closes over it and gives it thus a reflexa. How the reflexa forms in the human female is not known, but I incline to the belief that it either occurs as in the hedgehog, or that the human ovum grafts itself on a portion of the serotina denuded of epithelium, and that the serotina completes itself over it.

Where the so-called reflexa meets the serotina proper we get the villi at first remaining well developed, their development being less marked as we pass towards the highest point of the reflexa. The Drawings I show illustrate this well, the development of villi on the reflexa being quite considerable.

This growth of villi on reflexa is not persistent, and ultimately we get an atrophy of what one might term the reflexar placenta. This happens partly from the fact that the blood nourishment to the reflexa is much less than that to the serotina proper, and also to an active property of the villi recently indicated in a paper on the Placenta by Dr Gulland and myself. Where the tips of the villi touch the serotina proper one can see a band of condensed and degenerated tissue, due to an active and apparently phagocytic action of the villi. This enables us to understand how the reflexar placenta atrophies as pregnancy goes on, and ultimately the part of the reflexa over the os internum may remain only as a thick part of the membranes at the edge of the placenta proper. This process of degeneration and thinning of the reflexar placenta is well seen in my specimen of a four months' pregnancy.

I must now state the view I advocate for the occurrence of placenta prævia. It is that of primary implantation of the impregnated ovum low down or even over the os internum. The forcible objection that Kaltenbach urges against this view seems to me not quite valid. He holds that the small ovum would pass into the cervical canal and be lost. We must remember, however, that the hypertrophied and folded decidua there will practically obliterate the os internum, and thus implantation over it may happen. But why should such a low implantation happen? We only know that it is more apt to occur in cases where the mucous membrane has been unhealthy. The hypothesis I would advance—but merely as an hypothesis—is, that the human ovum can only graft on a surface denuded of epithelium, and that thus it does not graft in the Fallopian tube, but in some part of the uterine cavity where the epithelium has been removed by menstruation. If, then, the ovum does not meet with the connective-tissue surface until it has passed low down in the uterine cavity, some form of placenta prævia will happen.

Placenta prævia is thus primary implantation of the ovum in the lower uterine segment. The valuable contributions of Hofmeier and Kaltenbach do not seem to me, as yet, to have shaken the orthodox view I have taken on me to defend, but there is no doubt that all specimens must be carefully scrutinized from their point of view.

What is it, then, that makes this condition of placenta so dangerous to mother and child? The answer of course is, the hæmorrhage, and thus I therefore take up now—

I. THE SPECIAL MICROSCOPICAL ANATOMY OF THE PLACENTA WHEN ATTACHED TO THE LOWER UTERINE SEGMENT.

II. THE CAUSE OF THE SEPARATION OF THE PRÆVIAL PORTION.

I. THE SPECIAL MICROSCOPICAL ANATOMY OF THE PLACENTA

WHEN ATTACHED TO THE LOWER UTERINE SEGMENT, SO FAR AS IT BEARS ON SEPARATION OF THE PLACENTA AND BLEEDING.—This description is based on an examination of several specimens of pregnancy, but specially on a four months' pregnancy, where the lower edge of the placenta was within an inch of the os internum. The reflexa did not take any special part in the formation of the prævial portion in this case, although the great thickening of the decidua vera between the lower placental edge and the os internum gave a condition likely to favour the formation of a reflexar placenta.

The parts specially to be noted are—(1), *The muscular wall;* (2), *the spongy layer;* (3), *the large-celled layer with its intimate union to the tips of the villi;* (4), *the blood-supply.*

1. *The muscular wall of the lower uterine segment* is characterized anatomically by the longitudinal direction of its fibres, and functionally by its property of passive distention, and has been already sufficiently alluded to (*v.* p. 26).

2. *The spongy layer* is very well marked in early pregnancy, but is less broad in advanced uteri. At all stages of pregnancy it is well marked, is now known to be formed by the fundi of the dilated uterine glands, *and is of the highest importance, as being the layer where separation of the placenta takes place.*

3. *The large-celled layer with its intimate union to the tips of the villi.*—At this part of the placental section we note an intimate union of the villi with the large-celled serotinal layer. This has been already alluded to, but is here of importance, owing to its preventing separation at this level.

4. *The blood-supply in the region of the lower uterine segment.*—On this question of the blood-supply to the placenta we have much material; and now, thanks to the work of John Hunter, Farre, Sir William Turner, Waldeyer, Bumm, Hofmeier, and others, we have accurate and valuable information on this necessary point. The blood-supply to the lower uterine segment and maternal portion of placenta, when attached there, is derived from the uterine artery, and mainly from a branch of it which first passes through the retracting portion of the uterus. The curling arteries pour their blood into the intervillous spaces, while by Meckel's sinus, and veins usually lying in the cotyledonary substance, it passes back through the uterine wall to the maternal circulation.

The special facts concerning us, however, are,—(*a.*) What is the condition of the walls of the bloodvessels at the line of separation, *i.e.*, at the spongy layer? (*b.*) What is the source of the bleeding? To the first query we answer, that the walls of the bloodvessels, both arteries and veins, *at the plane of separation are thin-walled, and thus tear through easily.* On this point Farre and Waldeyer are very clear, and my specimens quite support their view. One thing also to be kept in mind specially is the abundant venous

supply of the lower uterine segment in placenta prævia; and the drawing of a vertical mesial section of the uterus from a patient with central placenta prævia, who died from pneumonia on the fifth day after labour, illustrates this point completely.

The source of the hæmorrhage is therefore *mainly the torn thin-walled maternal vessels in the spongy layer of the serotina.* Any other source, such as Meckel's sinus, is insignificant.

It follows from all that I have said that the arrest of hæmorrhage in placenta prævia is due to collapse of the torn thin-walled vessels and to pressure. The musculature in the lower uterine segment has no active retracting power, although uterine retraction can influence the main arterial supply to the lower uterine segment for the reason already given.

II. THE CAUSE OF THE SEPARATION OF THE PRÆVIAL PORTION OF THE PLACENTA.—This was first indicated by Matthews Duncan of Edinburgh and London, and is, with some additions, briefly as follows:—The hemispheroidal lower uterine segment of the full-time pregnant uterus becomes converted during labour into a tubular canal, has its superficial area increased, and has special transverse stretching, most marked the nearer the part is to the lower uterine segment. The portion of the placenta attached to the lower uterine segment does not equally stretch, and thus the filaments of the spongy layer become torn, *i.e.*, the prævial portion of the placenta becomes separated. From the torn bloodvessels we get what is known as unavoidable hæmorrhage. This mechanism is held by all as that occurring in labour in placenta prævia of full time.

Can we give any more exact data? What we want to know is, —(1), The superficial area of the lower uterine segment at full time; (2), the superficial area of the tubular canal into which it becomes converted when the lower uterine segment is fully canalized. These data, unfortunately, are not yet obtained, as a plaster cast of the cavity of a full-time uterus has not yet been made. We have, fortunately, casts of the eighth month's uterus and of the developed genital canal near the end of the second stage. These casts my friends Drs Barbour and Webster have placed at my disposal, and I have utilized them as follows:—

On the cast of the eighth month's pregnant uterus I marked off the lower uterine segment approximately as lying within 2½ in. or 6¾ cm. from the os internum. This hemispheroidal portion was covered with paper and the paper flattened out, measured. The area was 15 sq. inches.

In the developed lower uterine segment (with probably part of the cervical canal) I found the area, taken in the same way, to be 37·75 sq. inches.

These data are imperfect, as the pregnant uterus was an eighth month's one, and Barbour and Webster were unable to fix definitely

the lower limits of the lower uterine segment in the labour one. The measurements do not, however, exaggerate the amount of expansion of the lower uterine segment during labour, but fall short of it, inasmuch as the canalized part is considerably stretched during the pains. I hope that subsequent observers will, by plaster casts, give us fuller and more exact data.

Hæmorrhage, however, in placenta prævia often comes on at the seventh or eighth month, and many, especially Bayer, have attempted to explain this on the theory that the taking up of the supravaginal portion of the cervix into the uterus causes the separation of the placenta and the hæmorrhage. I am not inclined to accept this view; but the question is complex, and must be considered as still *sub lite* so far as hæmorrhage at the seventh month or so is concerned. The condition of the edge of the placenta in such cases, viz., its somewhat atrophied condition, is still open to investigation, especially from the point of view of the persistence of the reflexa.

Placenta prævia in all its aspects is no new thing in labour. At the end of pregnancy we have, normally, the membranes lining the lower uterine segment,—*i.e.*, we have the prævial membranes. These in normal labour become separated up to the retraction ring, and give the slight tinging hæmorrhage so indicative of first stage pains. In the first stage of abortion at the second month we get the thickened decidua vera in the lower segment also separated, and thus the more abundant bleeding of early miscarriage. In placenta prævia we get the prævial portion of the placenta separated from the morbidly vascular lower segment, and thus a hæmorrhage tremendously exaggerated as compared with the trifling diagnostic hæmorrhage of early normal labour.

I have now finally to take up the great question of treatment.

It would be impossible to do more than indicate the leading principles which should guide one in such cases.

It is evident from the preliminary anatomical and physiological facts I have laid before you, that the hæmorrhage can best be arrested by pressure, and that one should certainly use a form of pressure which also canalizes the lower uterine segment and cervical canal. These are, however, not the only principles for guidance one must rely on. In any treatment the antiseptic method must be carried out with the strictest care, and thus any prolonged form of treatment will put greater risks of failure in this most important feature of all obstetric operations. A last guiding point is that we are too apt to forget that the largest number of placenta prævia cases must be treated by the general practitioner, who looks to the specialist for guidance as to the simplest and safest method of treatment.

I am convinced that the plan of treatment most available in the majority of cases is the bipolar version of Braxton Hicks, performed as early as the dilatation or dilatability of the maternal

passages allows, with subsequent rapid or slow delivery of the child as the case may demand. The advantages of this method of treatment are:—(1), That it can be performed even with slight dilatation of the cervical canal; (2), that it absolutely checks hæmorrhage; (3), that the limbs and breech drawn down dilate the mother's canals; (4), that it does not perceptibly increase the mother's risks; (5), that only in cases of rigidity of the maternal parts or prolapse of the cord it diminishes the chance of the child's life; (6), that it permits of thorough antisepsis; (7), that it leads to no delay in urgent cases, and requires no special armamentarium. This treatment I advocate, unless in those slight cases where rupture of the membranes is sufficient.

I do not exclude dogmatically other forms of treatment. The tamponnade of the vagina until cervical dilatation is sufficient to allow of version has given good results in the hands of many. Of the separation of the placenta from the lower uterine segment as recommended by an eminent authority, Dr Barnes, I have no personal experience, and so far as I know no sufficient basis has as yet been brought forward to recommend its employment.

Practically speaking, we must always rely on early version and judicious delivery. This will give the best results in multiparæ. The difficult cases are in elderly primiparæ, or in those where the placenta occupies nearly the whole of the lower uterine segment (central). In the first named one gets great help from the use of india-rubber dilators (Keiller, Barnes, and others) passed into the cervix and followed by version as soon as possible, the labour being then left to go on as above indicated. In the so-called central placenta prævia it is best to perforate the placenta, bring down a foot, and leave the labour to go on slowly or not as may seem best.

We must not aim at too much. The mother's life is first, the child's second. One must therefore not spend too long in dilating with dilators, as that may cause great blood loss; nor extract too rapidly, as we thus get laceration of the mother and additional hæmorrhage.

After the question of version, the next most important is that of stimulation. We are often summoned when much blood has been lost and stimulation imperative. For such stimulation, nothing is better than hypodermics of sulphuric ether and autotransfusion. I would specially recommend subcutaneous saline transfusion with the apparatus of Münchmeyer. It is simple and effective, and, above all, is no last resort. To my mind its great value is that it can be used in advance of urgent indications, can be safely trusted even to the inexperienced and young practitioner, and does not require those absolute indications necessary for venous transfusion. Above all, it is a practitioner's remedy—one that from its simplicity can be improvised readily with a simple funnel, a piece of tubing, and the ordinary hollow needle of an aspiratory case. Sterilization of the apparatus is easy, and

the salt solution at 100° F. can be readily prepared in the proportion of one teaspoonful of salt to the pint. I have repeatedly used it with great benefit, and in my maternity service it is always employed in placenta prævia cases, even where the loss of blood has not been too great.

This seems to me an important point,—the fact that by it we can, in advance of serious indications, as it were, increase markedly the bulk of the maternal blood.

Even when delivery is completed the obstetrician's anxiety is not finished, and careful watch must be kept against *post-partum* hæmorrhage. As this most often comes from the lacerated cervix, reliance must be made on pressure with the fingers, or when necessary the lacerated lips may be stitched. If the hæmorrhage comes from the lower uterine segment, Duhrssen's iodoform tampon should have a fair trial.

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This atlas gives a valuable section of a uterus with lateral placenta prævia.

The question of statistics is too wide to consider here. Information can be obtained in the works of Trask, L. Müller, Auvard, Hofmeier, Behm. Müller gives 64 per cent. as infantile mortality; 1 in 4 as maternal. Recent statistics give maternal mortality as about 8 per cent.

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*The President* said the masterly demonstration which they had enjoyed embodied the results of some of those valuable series of observations which Dr Hart had accustomed them to expect at his hands. The contribution of to-night was important in that it would help to make more clear the relations of the placenta in those dangerous cases where it must become more or less detached before the birth of the fœtus can occur.

*Dr Barbour* said the demonstration implied an immense amount of anatomical work. He asked what the evidence was as to a phagocytic action of the layer of cells, and said he thought the benefit from rupturing the membranes in partial placenta prævia showed that separation was in part due to the uterine wall being drawn upwards, or the ovum forced downwards.

*Dr Gulland*, in regard to the phagocytic action of the cells, referred to a previous paper on the placenta (*Edin. Obstet. Soc. Trans.*, vol. xvii. p. 195).

*Dr Berry Hart* thought the cessation of hæmorrhage after rupture of the membranes in some cases was due to the retracting part of the uterus compressing the branch of the uterine artery to the lower uterine segment, and to the pressure exercised by the fœtus.

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## MEETING II.—DECEMBER 14, 1892.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr R. Stewart* showed a specimen of DOUBLE MONSTER. The mother was a ii.-para, 28 years of age. Dr Stewart was able during the pregnancy to make out twins and a breech presentation. When called to confinement he found the os dilated; he ruptured membranes, and there descended two legs. No progress was made, and on examination he found both breeches descending, and of the protruded legs one belonged to each fœtus. He tried to push up one fœtus and to bring down the other, but in each case failed. He then pushed up both, and found the heads high up, and that the bodies could not be separated. The pelvis was long and narrow; the children were large. Experienced extreme difficulty in getting the parts sufficiently far down to decapitate. He was greatly indebted to Dr Underhill and Dr Playfair for valuable assistance.

II. *Dr J. Aitken Clark* exhibited a specimen of a portion of the LARGE INTESTINE of a child, five months old, which showed two intussusceptions. On post-mortem examination the first was found in the left hypochondrium, and was part of the transverse colon intussuscepted into the splenic flexure, and measured 3 inches. The second was an intussusception of part of the descending colon into the sigmoid flexure and upper part of rectum, and was lying in the left iliac fossa and upper part of pelvis, and measured 3½ inches. The chief symptom was hæmorrhage. On rectal examination a distinct tumour was felt, and on palpating the abdomen an elongated soft sausage-like swelling was felt in the left iliac fossa dipping into the pelvis. The tumour in the left hypochondrium was not made out. He suggested an operation, but the parents refused. Inversion and large and frequent oil enemata were tried, but all to no purpose, and the child died six days after he first saw it.

III. *Dr Brewis* exhibited—(1.) A TUBERCULAR KIDNEY which he had removed from a patient post-mortem. The patient was 22 years of age, and had suffered for a year from a swelling occupying the left half of the abdomen. The kidney presented the appearance of a multilocular sac filled with thick pus. The ureter was greatly thickened throughout and contained pus. The symptoms were pain, diarrhœa, and high temperature. The urine was very albuminous. The general condition of the patient prevented removal or drainage of the kidney, and it was well that no operative interference was attempted, as the other kidney was much enlarged, and was entirely waxy and fatty. The intestines were also affected with tubercular ulceration. (2.) A LARGE OVARIAN TUMOUR removed from a patient that day; also the OVARY of the opposite side, which was interesting as showing commencing degeneration of the Graafian follicles.

IV. *The President* exhibited—(1.) THE SECUNDINES from a case of twins. One of the twins had reached the full term of development, and was born alive. The other had died between the third and fourth month, and having undergone a marked degree of compression, presented the appearance of the *fœtus papyraceus*. (2.) AN OVARIAN TUMOUR removed nine days ago from a patient, who was making a satisfactory recovery. The case had been diagnosed as one of ovarian tumour, but the presence of a solid mass in the right iliac region was difficult of explanation. As the tumour was found to be fixed in the pelvis, it was supposed to be one of those cases where the tumour, growing down into the broad ligament, causes the uterus to rise up into the abdomen. When the abdominal wall was incised, the mass in the right iliac fossa was at once seen to be the uterus enlarged to the size of the fist by a fibroid tumour. The left Fal-

lopian tube and broad ligament were seen stretching in front of the ovarian tumour to reach it in the left iliac region. As the finger could be passed between these structures and the surface of the tumour, a loop of thread was at once passed round and firmly tied, and a pair of compression forceps having been applied close to the tumour, the tissues were divided, and then clearly seen to be the entire pedicle of the tumour. It was not, however, immediately removable, as pretty extensive adhesions had formed between the surface of the tumour and the pelvic peritoneum, which caused considerable trouble in their separation. The adhesions had probably formed early in the history of development of the tumour, which had never given rise to any trouble until the growing size of the abdomen attracted her attention. (3.) A portion of a COLLOID OVARIAN TUMOUR from an elderly woman on whom he had performed ovariotomy three weeks previously, and who was slowly recovering. The patient had been in one of the surgical wards of the Infirmary, where she had been tapped under the belief that the case was one of ascites, but no fluid ran through the canula. When the abdomen was opened it was at once seen to be one of the cases described by Werth as pseudo-myxoma peritonei, where an ovarian cyst with colloid contents had burst and thrown its contents into the peritoneal cavity. In this instance the glutinous matter was diffused through the whole cavity and filled the pouch of a hernial sac. Masses of it had become adherent to the entire peritoneal surface, visceral and parietal, which had become vascular and inflamed so as to throw out proliferating vessels among the viscid masses, tending to their absorption. This process could be seen going on on the surface of the tumour itself on the portion exhibited. (4.) Another large OVARIAN TUMOUR, which had been sent to him by Dr Alwyn Raimes of York. It weighed (with the uterus) 31 lbs. It came from a woman, 61 years of age, whom he (Dr Raimes) had attended for three or four years. Latterly it had grown very rapidly, and had pushed the sternum outwards at right angles to the middle line. She had suffered from menorrhagia for a few years previously, but in the last two years this had been absent. The tumour had grown down into the broad ligament, and became intimately adherent to the back wall of the uterus, the cavity of which had become greatly elongated. Diagnosis during life would have been quite impossible, and any operation hopeless.

# V. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

(SECOND SERIES.)

## I. Allantoido-angiopagous Twins—Description of a Fœtus Paracephalus dipus acardiacus.

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The interior of the pregnant uterus may be regarded as the laboratory in which Nature prosecutes her most intricate pathological experiments. The altogether peculiar conditions under which the fœtus in utero exists permit the occurrence of diseases and deformities so grave as to be absolutely incompatible with extra-uterine life. When, however, the uterus contains a single fœtus, there are limits assigned to the pathological changes in structure and function that can be produced; but when there are twins in utero, when these are contained in the same chorionic sac and nourished by a single placenta, and when, moreover, they are of the allantoido-angiopagous variety, there seems to be practically no degree of deformity too great for Nature to reach. Monstrosity is kept within bounds in the autosite, but it is to all intents and purposes limitless in the omphalosite and parasite. Anencephalus, exomphalos, phocomelus, and cyclopia are indeed malformations of a gross character; but they pale into comparative insignificance when placed alongside of the lesions met with in the deformed fœtus that is dependent for its growth and development upon the placenta of its brother or sister. It is with monochorionic twins that Nature is able to produce her most startling results.

The presence in utero of two fœtuses, both supplied with nourishment from a single placenta, makes possible the occurrence of such grotesque, bizarre, and extraordinarily aberrant forms as the acephalic, acormic, acardiac, amorphic, and anidean fœtus. In some of these productions, which well deserve the name of monstrosities, the human form is nearly lost, whilst in others it may safely be said to be entirely wanting; but the specimen about to be described, although markedly deformed, has yet the semblance of the infantile form, and belongs to the least monstrous variety of allantoido-angiopagous twins—that, namely, which has been called paracephalian or paracephalic.

It may be well to indicate briefly the place in a scheme of classification which allantoido-angiopagous fœtuses occupy. According to Taruffi, whose nomenclature and method of arrangement I have principally followed, all malformed fœtuses may be divided into two great sections—the *terata monosomata* and the *terata polysomata*

(the single and the double or triple monsters). By far the larger of the two subsections of the terata polysomata contains the *disomata* or double monsters. The disomata, again, are subdivided into two groups—the *d. dierita* and the *d. synerita*. In the former group the bodies of the two fœtuses are not immediately united, whilst in the latter there is a direct and close union between them: there is diæresis in the one case, synæresis in the other. The synæretic disomata are usually known as the double or composite monsters, and they comprise such forms as the syncephalic, dicephalic, thoracopagous, and melomelous; but with them we have not at present to deal. The diæretic disomata have been arranged by Taruffi in two groups, one of which contains the *monochorionic disomata*, and the other the *omphalo-angiopagous disomata*. The former have also been called homologous twins (Ahlfeld), and they have been defined as normally formed twins of the same sex enclosed within one chorion, and drawing their nourishment from a single placenta. Whether or not these fœtuses ought to be considered as teratological is doubtful (the question will be considered later, when I shall have described a specimen of this kind); but there can be no hesitation in placing the members of the second group—the omphalo-angiopagous twins—among the monstrosities. The disomata omphalo-angiopagi have been defined as *twins of the same sex enclosed within a single chorion, one of which shows more or less grave developmental defects, and communicates with the other by means of the vessels of the umbilical cord in the neighbourhood of the placenta.*

Taruffi has subdivided the disomata omphalo-angiopagi[1] into the following varieties:—

I. Paracephalus.
  1. Dipus.
    A. Cardiacus.
    B. Acardiacus.
  2. Apus.
  3. Pseudo-acormus.

II. Acephalus.
  1. Thorus.
    A. Cardiacus.
    B. Acardiacus.
  2. Athorus.
  3. Pseudo-acormus.

III. Amorphus.
  1. Mylacephalus.
  2. Anideus.

[1] Professor Simpson has pointed out that to English ears the term "omphalo" is somewhat misleading, as it suggests a connexion with the omphalo-mesenteric vessels. I therefore adopt the term "allantoido-angiopagous" as more etymologically correct.

The paracephalic twin has more or less defective limbs and head, and sometimes it has neither the lower extremities nor the trunk; in some cases it is provided with a heart, in others this is wanting. In the case of the acephalic fœtus the head and neck, and sometimes a portion of the trunk, are absent; the heart is usually, but not invariably, absent. The fœtus amorphus has not the external appearances proper to the infant. In the paracephali the deformity affects chiefly the lower part of the body, in the acephali the upper.

*Historical Notes.*—It may be well briefly to sketch the growth of correct views concerning the nature of allantoido-angiopagous twins and their place in a teratological classification. This will be best accomplished by making a survey of the more important communications and descriptions that have been given of this form of monstrosity by various writers.

The first undoubted specimen of a deformed twin was described about the middle of the fifteenth century, for we must leave out of account as of little scientific value the statement of Ctesias, the historian, that Roxana, the wife of Cambyses, gave birth to a headless infant (400 B.C.). Taruffi has found in the Royal Library of Bologna an unpublished manuscript giving a history of that town between the years 1340 and 1453, and containing the following statement with regard to a malformed fœtus:—"In the city of Bologna there was a woman who gave birth to two creatures—one was a male, and had all the limbs; then she gave birth to one without a head, arms, and legs, with the umbilicus and with a few hairs where the neck should have been; it had a small opening which showed that it was a female, it was half a cubit in length, and remained alive for nearly three hours." From the description, and from the sketch which accompanied it, this was evidently a true example of an acephalic fœtus. The date of the observation is 1431, but the writer's name is unknown.

During the next two hundred years no fresh case seems to have been reported, for although both Ambrose Paré and Aldrovandi spoke of headless creatures, they referred rather to the mythical acephalous people of Africa and to fœtuses which they believed to be like them, but which were really instances of anencephaly. The confusion so early introduced between the fœtus without a brain and that without a head has persisted almost to the present time, and has greatly checked the growth of correct views concerning both the anencephali and the acephali.

Soon after the middle of the seventeenth century several acephalic fœtuses were described by Everard, Lankisch, Marco, and Schelhammer. These writers noted the absence of the heart in their specimens, and thus aroused the suspicions of the scientists of the day, who could not understand how a fœtus could be developed without a heart, for the importance of the statement made by Lankisch and the others, that each of these malformed infants

was born along with a healthy twin, was entirely overlooked. One conclusion, however, of no little value was drawn from the study of such cases, and this was, that since a headless fœtus cannot receive nourishment through the mouth, it must get it by some other channel, viz., through the umbilical vessels.

Two specimens of paracephalus were described towards the close of the seventeenth century, the one by Jaenis in 1673, and the other by Göller in 1683; and in 1697 Vallisneri put on record an anideau monster. Of course these authors did not give the above names to their specimens, for the term paracephalus was first used by Saint-Hilaire more than a hundred years later; Göller, for instance, described his case simply as a "monstrous human abortion."

During the eighteenth century many malformed fœtuses, which we can now recognise as allantoido-angiopagous in nature, were described; but whilst the teratologists of the time busied themselves with theories as to the possible means of nutrition and circulation in such acardiac monstrosities, they seem strangely enough to have overlooked the important facts observed by Pujol (1706) and Mery (1720) in two acardiac twins. Both these writers examined the placentæ and umbilical cords of the twin fœtuses, and recognised that, whilst the placenta in each case was single, there was a vascular connexion between the cord of the normal and that of the deformed twin. Pujol and Mery were in advance of the knowledge of their time, and it was not till long afterwards that the two important facts insisted upon by them (the plural character of such births, and the vascular connexion between the umbilical vessels) were recognised. Indeed, both in the last century and in this, the clinical history of the case and the examination of the after-birth have seldom been dwelt upon by the writers who have described malformed twins. In 1784 Sandifort collected together a considerable number of recorded cases of acephalic and acardiac fœtuses, and drew certain deductions therefrom; but his observations, unfortunately, led him to the conclusion that the acephali were closely allied to the brainless fœtuses (anencephali). This conclusion had unhappy results, for it led to the placing of the acephali among the single monsters and in the same genus with the anencephalic fœtuses. Sandifort's erroneous mode of classifying the acephali with the anencephali was not abandoned till quite recent times (1865), when Förster placed them with the dwarfs, and considered them as instances of defective development of the whole body.

During the present century several attempts have been made to arrange the various specimens of deformed twins in separate groups. Breschet in 1821 adopted three subdivisions: the first contained fœtuses wanting only the head (acephali); the second, those wanting both head and thorax (acephalo-thori); and the third, those in which head, thorax, and abdomen were absent (acephalo-gastri). It will be seen that no place was found in

Breschet's scheme for the twin-fœtus with a more or less defective head. Elben, writing in the same year as Breschet, did much to fix the opinions of German medical men with regard to malformed twin-fœtuses, and the influence of his views is still to be seen in the teratological works of Förster and Ahlfeld. Elben found, from an examination of the literature of the subject, that in nearly every recorded case the heart was absent, and he saw in the absence of the heart a general character for not only the acephalic, but for the mylacephalic and anidean fœtuses also. On this account the term acardiac came to be commonly employed in Germany as a general one for the whole group of malformed twin-fœtuses, so that Förster in 1861 spoke of three varieties of the acardiaci—(1), the amorphi; (2), the acephali; and (3), the acormi.

Whilst, however, Elben's views were favourably received in Germany, by French teratologists they were scarcely at all accepted. Isidore Geoffroy Saint-Hilaire (1836) noted that the acephali were not invariably acardiac, and that acardiac fœtuses were sometimes provided with a head. Elben's classification made no provision for such specimens, and Saint-Hilaire proposed, therefore, to use the more or less deformed state of the head as a means of arrangement. He placed all these malformed twins amongst the single monsters (monstres unitaires), and formed with them the second order, that of the Omphalosites. He recognised three tribes of omphalosites: the first contained fœtuses showing some degree of cephalic defect (paracephali); the second, those without a head (acephali); and the third, those with a rounded form, and without any external human appearances (anideans). The following abbreviated scheme will show the place given by Saint-Hilaire to deformed twins:—

*Monstrosities.*

Class I.—Single monsters (monstres unitaires).
- Order I.—Autosites.
  - Ectromelic, symelic, exencephalic, anencephalic, cyclocephalic, etc.
- Order II.—Omphalosites.
  - Tribe 1.
    - Family 1. Paracephali.
      - Paracephalus.
      - Omacephalus.
      - Hemiacephalus.
    - Family 2. Acephali.
      - Acephalus.
      - Peracephalus.
      - Mylacephalus.
  - Tribe 2. Anidean.
- Order III.—Parasites.

Class II.—Double monsters (monstres composés).

Saint-Hilaire's scheme was a distinct improvement upon pre-

vious plans, for it afforded a means of grouping together closely allied species of deformity; but it was far from perfect, for it overlooked the fact that omphalositic fœtuses were always twins. Had Saint-Hilaire recognised the invariable plural character of the conception in these cases, and the allantoic connexion between the twins, it is probable that he would have hesitated before placing them amongst the single monsters.

From what has been already said of Förster's classification, it is evident that no provision was made therein for the grouping of the paracephalic fœtuses described by Saint-Hilaire. Förster, therefore, was compelled to place them amongst the acephali, an arrangement which was most unfortunate, for the expression paracephalous acephalus, which is a contradiction in terms, was thus introduced. Claudius and Ahlfeld added to our knowledge of acardiac fœtuses by their ingenious explanation of their mode of origin, and the latter expressed his theory of origin in the name "allantoic parasites," which he gave to the members of this group of monstrosities. Ahlfeld, however, still used the term "acardiac" as the general designation of the whole class, and thus was compelled to find a place for fœtuses provided both *with a head and a heart* among the *acephalous acardiaci!* The name "acardiacus anceps," which he proposed as an equivalent for paracephalus, demonstrated that it was impossible to accommodate the old nomenclature of Elben to the recent discoveries of teratology without causing great inconvenience and confusion.

It was evident that a new nomenclature was needed to express the important discoveries that had been made concerning the nature and origin of deformed twins. Taruffi, therefore, proposed for them the general name omphalo-angiopagous disomata, placing them at once amongst the terata polysomata. This name is better than Saint-Hilaire's omphalosite and Dareste's adelphosite, and is much more correct than Elben's acardiacus, for it emphasizes two most important characters,—the plural nature of the gestation, and the existence of a vascular connexion between the twins through the umbilical cords; but for etymological correctness the term allantoido-angiopagous would have been better still. Taruffi also noted that neither was the head nor the heart invariably absent in these fœtuses, and he therefore used Saint-Hilaire's term paracephalus for such cases as showed a more or less perfect head. When the heart was also present the fœtus was designated paracephalus cardiacus. The rest of Taruffi's scheme of classification did not differ very greatly from those of Saint-Hilaire, Ahlfeld, and Förster. It is rather remarkable that the manifest advantages of Taruffi's method have not commended it to modern writers on teratology;[1] but the systems of Saint-Hilaire and

[1] In the two most recent works on Teratology, Hirst and Piersol's *Human Monstrosities* (1892), and Guinard's *Précis de Tératologie* (1893), Saint-Hilaire's classification is still adhered to.

Förster have been for many years so fully accepted that their replacement by any other must necessarily be a work of some time.

In addition to Taruffi's contributions to the study of allantoido-angiopagous twins, it is necessary to mention those of Breus (1881). He has endeavoured to prove that deformed twins arise in a manner quite different from that supposed by Claudius and Ahlfeld. Instead of regarding them as due to tardy allantois formation, whereby one of twin fœtuses monopolises the whole internal surface of the primary chorion, whilst the other is forced to implant its allantois on that of the first, he believes that the deformed twin is primarily so defective that it is not capable of independent intra-uterine nutrition, that it dies, and that then the blood current of the normal twin enters it and keeps it nourished in an imperfect degree until the full term of pregnancy is arrived at.

Such were some of the most important landmarks in the history of the progress of knowledge concerning these curious fœtuses; and I may now proceed to the description of the only paracephalic twin that I have met with.

## Clinical History and Description of a Fœtus Paracephalus dipus acardiacus.

*For the paracephalic fœtus about to be described I am indebted to Prof. A. R. Simpson, to whom it was sent by Dr John Edmondson of St Helens; the latter has kindly furnished me with the clinical history of the case. It was shown and briefly described at a recent meeting of this Society (May* 1892).

### Clinical History of Dr Edmondson's Case.

The mother was 35 years of age, and a vii.-para. She had been married when 23 years old, and had suffered for some years from chronic bronchitis. She was in poor circumstances, and of a delicate constitution. Her past pregnancies were six in number; in two of them (the first and fourth) forceps had been required to effect delivery. None of these gestations was plural, and save for the use of forceps above noted, there was nothing abnormal in the labours.

During her present pregnancy (the seventh) the patient suffered from pain in the right side of the abdomen, which made walking very difficult. There was also a troublesome amount of bronchitis. Labour came on near the full term, and when Dr Edmondson arrived at the house a perfectly well-formed male infant had been born and its cord tied. The birth was followed by severe hæmorrhage, and as the placenta had not yet come away, Dr Edmondson passed in his hand to remove it. In doing so he discovered that there was a second child in utero. Having delivered the placenta of the first infant, he hooked down what he thought to be the leg of the second child. The great thickness of the parts above the knee made him

Plate I.

Wm CATHIE DEL ET LITH

Plate II.

Wm CATHIE DEL. ET LITH

doubt the correctness of his diagnosis; but the appearance of a foot at the vulva finally settled the matter. In the meantime the mother was almost pulseless, and further advice was sought. Before, however, the consultant arrived the second child was born. Its placenta was also retained, and in addition was adherent to the uterus in the upper polar circle. There was, therefore, more hæmorrhage until Dr Edmondson passed his hand in and detached and removed the afterbirth. The time that elapsed between the birth of the first infant and the removal of the placenta of the second was little more than one hour. The first infant was born alive, the second was still-born.

On the third day of the puerperium the temperature rose to 100°·4; but it fell again on the following day, and the mother did fairly well, although she was in a weak state for a much longer time than she had been after her previous confinements. Labour took place on January 10th, 1892, and in a letter, dated August 13th, the patient is reported to be well.

The father was a perfectly healthy man. Both infants were males. The first born was quite well formed, although of small size. He was delicate from the time of birth onwards, and died when four months old from an acute attack of bronchitis.

The mother had two married sisters, of whom one had a family of five children and the other one of six. One sister, it was stated, had died on the ninth day after confinement from inflammation of the womb. There was no family history of plural births.

Dr Edmondson was of opinion that the placentæ were separate in this case, and that the cords were inserted in the usual position; but as the afterbirths were unfortunately destroyed immediately, and as the critical state of the mother fully absorbed all the medical man's time and attention, it is possible that some vascular connexion may have existed between the placentæ or cords. The examination of the deformed infant revealed conditions which can only be explained by supposing that some such connexion existed; but to this subject further attention must be paid after the morbid anatomy of the fœtus has been described.

## Morbid Anatomy.

### I. Of the Fœtus.

A. *External Appearances* (Plates I. and II.).—The fœtus, a male, had a total length of 28 cms., and the distance from vertex to symphysis pubis was 18 cms. It may be best described as made up of two parts attached to each other in the umbilical region by what may be called a very narrow waist. The upper part consisted of the head, shoulders, and upper limbs; the lower, of the pelvis and lower extremities. In circumference the head measured 33 cms., and the shoulders 32 cms.; but the transverse diameter of the latter was greater than that of the former. The circumference

at the point of constriction was only 12 cms., and no bone could be felt in the structure joining together the cephalic and pelvic parts of the fœtus.

In its external appearances this fœtus showed gross malformations (*vide* Plates I. and II.). The skin of the head passed almost directly on to the misshapen arms, and there was, therefore, no trace of a neck. Immediately below the shoulder-girdle was a deep constriction—the narrow waist already alluded to. The trunk widened out again in the region of the pelvis, and the lower limbs were permanently fixed in a tailor-like position.

In the region of the head it could be seen that the upper part of the cranium was membranous, not osseous. Palpation confirmed this, and made it certain that part of the parietal bones and a portion of the frontal were wanting, and that there was hydrocephalus. Some scattered hairs were to be seen on the scalp, lying principally at the sides of the head and coming forward somewhat in the manner of whiskers. At the nape of the neck and sides of the head, at about the level of the mouth, the subcutaneous tissues were thickened, and had an elastic, soft feeling, whilst here and there the sensation of fluctuation could be elicited. The face was greatly deformed. There was no nasal projection, but in its place existed a linear depression lying between two blind pits which represented the nostrils. On each side of this very rudimentary nose lay an eye-aperture with twisted and defective eyelids. The orbit on the left side was larger than that on the right. No properly formed eyeball could be detected.[1] The eye-apertures were on the same level as the nasal pits, and in close apposition to them. At a distance of nearly 2 cms. below these structures was situated the mouth, in which a small tongue could be seen. On opening the mouth it was discovered that there was a fissure in the median line of the palate. Below the buccal aperture was the indication of a chin. On the left side, at a distance of 3 cms. from the angle of the mouth and at the same level as the chin, was a blind pit, which probably represented the external ear. On the right side, at the same level, but at a distance of 3·5 cms. from the angle of the mouth, was a button-like projection of skin, measuring about 1 cm. in diameter, and having at its centre another blind pit; this was doubtless the representative of the right auricle. Above and behind this structure were two small vesicles or blebs.

In the region of the neck and shoulder-girdle the skin lay in folds, and on palpation a greatly-thickened, soft subcutaneous tissue-layer could be made out. So thick was this layer that the bones of the arms could scarcely be felt. The skin and subcutaneous tissue of the head passed like a cape on to the arms, leaving

[1] It must be remembered that the specimen had been in spirit for four months before it came into my hands, consequently the parts had no doubt shrunken.

only the hands free. The thumb and index finger were absent on both sides, and there was double club-hand of the radial type. Nails were present on all the fingers.

On the anterior aspect of the constricted part of the trunk was seen a ruptured umbilical hernial sac. This contained a few coils of intestine, which were closely adherent to each other and to the wall of the sac at its upper part. At the neck of the sac inferiorly were one or two slender adhesions passing to the intestinal coils. A cæcum could be distinguished with a vermiform appendix (about 1·3 cm. in length), and the coils of gut were probably representatives of the colon. So far as could be made out by palpation no vertebral column existed at the point of constriction.

In the region of the pelvic girdle were seen a penis and scrotum, but no testicles could be felt in the latter. Posteriorly there was a patent anal aperture lying deeply between very prominent buttocks. The subcutaneous tissue in this region seemed to form a greatly thickened layer, and was markedly soft in consistence. The lower limbs could not be straightened out; they were fixed in a tailor-like position. The feet were clubbed. On the right foot were three separate toes; but one of these, the outermost, was evidently made up of three digits fused together. On the left foot were three single toes. There were abrasions of the cuticle on some parts of the lower limbs, and these were especially marked on the feet. There was a tear in the soft structures of the left leg just below the knee; this had probably been caused by traction during delivery, combined with a certain degree of innate friability of the part. Numerous furrows in the skin existed all over the lower limbs, but especially on their posterior aspect. As was the case with the arms, the subcutaneous tissue of the legs felt greatly thickened and soft.

B. *Appearances of the Viscera, etc.*—When the scalp and thickened cerebral membranes were divided, it was found that there was an enormous accumulation of clear fluid in the position of the lateral ventricles. The falx cerebri intervened between the fluid accumulations above, but inferiorly they communicated. Part of the frontal lobes, a thin layer of cerebral tissue laterally, a greatly macerated pons varolii inferiorly, and a normal-looking cerebellum inferiorly and posteriorly, were all the parts of the central nervous system that could be recognised. When these structures were removed no trace of a foramen magnum could be discovered. Several of the cranial nerves could be seen leaving the interior of the skull, but from the soft nature of the parts they could not be satisfactorily traced.

When the skin was reflected at the back and sides of the head several cavities containing clear fluid were revealed. Two of these were of the size of a large walnut, and lay one on each side of the middle line just behind the occiput and in the subcutaneous tissue, which was here much thickened. Two similar cysts, also with

clear fluid contents, lay one on each side, just behind the spot where the rudimentary ear-pit was visible on the skin surface. Besides fluid, these cystic cavities, which had a smooth, glistening lining membrane, also contained soft, curdy, yellowish-white masses. One or two smaller cysts were found lying between those that have been already mentioned. The presence of fluctuation in the region of the neck was thus accounted for.

There was no thoracic cavity and no diaphragm. It was found, on cutting down in the middle line of the neck, that there was a larynx and trachea measuring about 7 cms. in length, and terminating blindly just above the umbilical hernial sac. At its upper end the larynx opened into the back of the buccal cavity. There was no trace of an œsophagus. No structures resembling heart or lungs could be found.

The subcutaneous tissue of the arms formed a layer 2·5 cms. in thickness, and was composed of whitish, glistening, and densely infiltrated tissue. From it a clear serous fluid oozed out on pressure. No cysts could be seen in it with the naked eye. The muscles of the arms were apparently represented only by bands of fat-like tissue running in various directions immediately beneath the subcutaneous layer and near to the bones.

There was no abdominal cavity properly so-called, for the coils of intestine were all densely adherent to each other and to the surrounding parts. On tracing the bowel inwards from the hernial sac, it was found that a loop of it like the sigmoid flexure passed downwards, and ended in a part which became continuous with the rectum. For a probe passed up through the anal aperture could be felt in the loop of bowel above mentioned, and the fact was also ascertained by dissection. The intestines contained a small quantity of a dirty-white porridgy material. The whole bowel measured only 25 cms. in length when its adhesions were divided, and it was separated from its short and contracted mesentery. The stomach, liver, spleen, kidneys, and suprarenal capsules were absent, unless four small bodies which were found in close connexion with the intestine might be regarded as representing some of these organs. One of these bodies was 1 cm. in length and 5 mms. broad; it lay in the curve formed by the cæcum, and was adherent to it. The three others lay near to each other, and were also bound to the coils of bowel; one was 1·5 cm. in length, another 8 mms., and the smallest 3 mms. The largest was somewhat round in shape, and the smaller ones were flattened. The urinary bladder was present; it was small in size, and lay in its normal position in front of the rectum. A urethra passed from the bladder through the penis, and there was a prostate gland. No testicles were found in the scrotum. There was no connexion between the bladder and the rectum. The vascular arrangements will be described along with the umbilical cord.

In the case of the lower limbs the œdematous subcutaneous

tissue had a thickness varying from 1·5 to 1 cm., and here and there in it small pea-sized cysts could be seen.

C. *Characters of the Skeleton.*—In the region of the head the vault bones were all present, but some of them were imperfect. The parietals, supra-occiput, and the two halves of the frontal did not lie near one another at the vertex, but left at that part a membranous interval of considerable extent. Further, the squamous portion of the temporal showed delayed ossification; it consisted of four or five small scales of bone united together by membrane. There was a slight indication of a zygomatic process and no sign of the annulus tympanicus; but the petrous and mastoid parts of the bone were well developed. The ex-occipitals, basi-occiput, and supra-occiput were in contact with each other but not fused together; *there was, therefore, no foramen magnum.* The sphenoid was well ossified, as was also the ethmoid. The nasals, malars, lachrymals, and the superior maxillæ did not show any abnormalities; but there was no trace of palate bones nor of vomer. The lower jaw had a very feebly marked coronoid process. There were no nasal fossæ. The roof of the mouth, therefore, lay almost immediately beneath the basi-sphenoid and the ethmoid. The normal number of dental germs existed in the maxillary bones. The hyoid was present.

There was *no trace whatever of a vertebral column.* Nothing but muscular and adipose tissue intervened between the scapulæ in the upper part of the trunk, and in the lower the two innominate bones came into close contact posteriorly to form a small and rudimentary pelvic cavity. There was no sternum, and there was no trace of ribs or of clavicles.

The scapula was rudimentary: it consisted of a small scale of bone attached to the glenoid cavity. The humerus was normally developed; it measured 5·5 cms. in length. There was no radius; and the ulna, which was 3 cms. in length, was anchylosed to the lower cartilaginous end of the humerus at the elbow-joint. A cartilaginous carpus was present, and there were three metacarpal bones along with their phalanges. The bones of the thumb and index finger were wanting. The carpus was articulated to the lower end of the ulna at a right angle, giving rise to the club-hand.

The os innominatum showed the degree of ossification usually met with at birth. The femur measured 6·5 cms. in length, and had no ossific nucleus in its lower end. The tibia and fibula were both present, and each had a length of little more than 5 cms. The knee-joint was anchylosed in a flexed position, and there was no trace of a patella. There were two metatarsal bones in the right foot, and there were the usual ossific nuclei in the os calcis and astragalus. The phalanges of three toes were present; but the distal phalanx of the outermost toe was triple. The skeleton of the left lower limb was similar.

D. *Microscopic Appearances.*—Both the microscopic investigation of the tissues and the chemical examination of the cyst-contents were rendered unsatisfactory by the long period of time (four months) which had elapsed between the birth of the fœtus and its dissection.

Several sections of skin and subcutaneous tissue from the thigh, arm, and head were examined microscopically, and in those from the first two situations the three layers—cutis, subcutaneous tissue, and musculature—were clearly recognisable. The epidermis, with a thin coating of vernix caseosa, was present at most places, but here and there it was detached. The cutis had an opened out appearance; but its fibres seemed normal in size, and did not appear to be increased in number. Here and there hair follicles, hairs, and rudimentary sweat-glands were to be seen. The subcutaneous tissue formed a thick layer of a delicate areolar tissue, the meshes of which were polygonal in outline and contained a clear serous fluid with no fat cells. There were scarcely any bloodvessels to be seen either in the cutis or in the underlying areolar layer. Beneath the subcutaneous tissue was the representative of the muscular layer. Hardly any muscle-bundles were to be made out,—they seemed to have been replaced to a large extent by adipose tissue, and beneath them lay the periosteum and the bone of the part.

A section of the wall of one of the large cysts at the back of the neck showed a fibrous structure; but no endo- or epithelial lining could be made out. Microscopical and chemical examination of the cyst-contents gave unsatisfactory results; only a few broken-down cells and masses of granular debris could be seen, and the fluid contained a large proportion of spirit which had soaked into the tissues.

The investigation of the little gland-like bodies found in the neighbourhood of the intestine revealed the following appearances: The largest of these bodies showed the microscopic structure of the liver at an early stage of development. The second in size, that which lay near the cæcum, was found to be a separate loop of bowel, and showed in its interior some crypts of Lieberkühn. The larger of the other two bodies had an appearance somewhat resembling that of the spleen, and the smaller showed tissue not unlike that seen in the kidney in early fœtal life. These structures, like the skin and subcutaneous tissue, were markedly anæmic.

## II. Of the Annexa.

In the absence of the placenta and membranes all that could be learnt with regard to the state of the fœtal annexa had to be gathered from the examination of the portion of umbilical cord attached to the body of the deformed infant. The total length of the attached cord was about 48 cms. On close inspection it became evident that it consisted of two parts. The distal portion resembled

a normal umbilical cord; it was 32 cms. in length, was tied about 5 cms. from its free end, and had a circumference of about 4 cms. It contained two arteries and one vein lying in a normal amount of the jelly of Wharton. When traced towards the fœtus it was found to terminate at a point about 16 cms. distant from the umbilicus in a disc of tissue that resembled the wall of a blood sac, or part of the amnion with a thin layer of placental tissue attached. Here the torn ends of the vessels were seen. In the other part of this disc were found the torn ends of two other vessels, an artery and a vein, and these could be traced, running in the membranes which formed the remaining 16 cms. of the cord, to the umbilicus of the fœtus, into which they passed. There was, therefore, no properly formed cord between the disc of tissue and the fœtus, only two small vessels lying in the membranes which formed the walls of the ruptured umbilical hernia-sac.

At its point of entrance into the body the single umbilical artery broke up into two branches. One of these passed upwards to the neck, where it again subdivided into arteries for the head and upper limbs; the largest of these subdivisions were the two that passed up to the head, lying one on each side of the larynx and trachea. The other primary branch proceeded downwards to supply the pelvis and lower limbs. The umbilical vein also divided into two trunks, and these had a distribution similar to that of the arteries.

It is somewhat difficult to reconcile the description of the fœtal annexa given by Dr Edmondson with that of the fœtus and umbilical cord learnt from dissection. The fœtus was acardiac, and, therefore, its circulation must have been carried on by the heart of the other twin. In order that this might be accomplished it is necessary to suppose that the two circulations became continuous at some point: there may have been a union between the two placentæ, or vessels may have passed from one cord to the other, or from the membranes of the one fœtus to those of the other. I am inclined to regard the following explanation as that which best accords with the ascertained conditions. The distal part of the umbilical cord was the cord proper of the normal twin. At the disc of tissue it joined the placenta, but at the same spot gave off two vessels (an artery and a vein), which passed in the membranes to the deformed twin, and formed the vascular connexion between it and its well-formed brother. The two placentæ removed by Dr Edmondson were probably the partly united halves of a single afterbirth.

In the peculiar relations and arrangement of the umbilical vessels it is very probable that the cause of the deformities that existed in this twin fœtus is to be found; but it must at the same time be admitted, that it is just possible that the malformations may have been the primary, and the inosculation of the two fœtal circulations the secondary phenomenon.

In my next communication I shall give a summary of the morbid conditions found by other observers in fœtuses of the paracephalic variety, and shall compare these with the appearances described above, and draw from them some general conclusions with regard to this form of monstrosity.

*Note.* — The dissection of the deformed twin fœtus above described was carried out in the College of Physicians' Laboratory, Edinburgh.

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*The President* thought the Society were greatly indebted to Dr Ballantyne for the interesting and valuable paper he had just read. These studies in Teratology had already enriched their Transactions, and this new contribution would help greatly to clear up our ideas in this rather obscure department of obstetrical pathology. The classification which Dr Ballantyne had advocated might seem at first sight complicated; but on consideration it would be found to simplify the subject. It might be startling, as Dr Ballantyne had admitted, to enrol the well-formed twins developed from a single ovum among teratological subjects. But the recent observations of Rumpe justify this arrangement. Various considerations seemed to show that twinning generally was to be regarded as an abnormality in development. Sir Arthur Mitchell, *e.g.*, had many years ago collected a series of statistics which went to show that the mental developments of twins were below the average, and that there was a tendency amongst them to bodily deformities. These observations related to twins in general. But Rumpe's observations indicated that these pathological tendencies of mind and body were not manifested in the group of twins of binovular origin, but were more marked in the uniovular twins, which were specially liable to be produced by women at the commencement and towards the close of their reproductive career. The designation that Dr Ballantyne had applied to the monstrosity which he had so well described, though unfamiliar, indicated better than its old designation, acardiac monster, the mode of its production. Many years ago he had shown and described to the Society an excellent specimen of this variety of twin, and had shown that the explanation of Claudius best applied to the manner of its development. He had also shown another, which presented the appearance of the three legs seen on a Manx coin.

*Dr J. Halliday Croom* should like to add his testimony to the value of Dr Ballantyne's paper. The subject was one which did not lend itself readily to discussion, but Dr Ballantyne seemed to him to deserve the thanks of those who were teachers as having simplified the classification of monsters, and done good work in presenting a very difficult subject in a very clear manner. The tissue of which the thickened thighs was composed was apparently of the same tissue found in the acardiac fœtus, a specimen of which

he had described and shown some years before. In the very careful description which Dr Ballantyne had given of his case, Dr Croom would like to inquire as to his explanation of the constriction round the abdomen separating the abdomen from the thorax.

*Dr Ballantyne,* in reply to a question by Dr Croom, said that the exact meaning of the constriction at the level of the umbilicus was difficult to arrive at. It seemed to him, however, that since there was no vertebral column, the shoulder and pelvic girdles were simply held together by the quantity of tissue sufficient to keep up a vascular connexion between the two parts of the fœtus.

## VI. A CASE OF BLEEDING BY THE URACHUS.

By W. Ramsay Smith, M.B., C.M., B.Sc. Edinburgh.

This case, which is of considerable importance clinically and is of much interest embryologically, came under my care while I was acting as substitute for Dr Simson Fowler, Juniper Green. By Dr Fowler's courtesy I am able to report it.

The history of the case, so far as I have been able to make it out—for it was only after the case had assumed a somewhat serious aspect that I was informed of it—is as follows:—The subject, a female infant, was born on the afternoon of August 3rd. Although the labour was complicated by a flat pelvis and typical pendulous belly, and the membranes were ruptured beforehand by a diligent if somewhat officious midwife, and the presentation could not be made out until the mother was under chloroform, yet, thanks to Dr Haultain's skilful assistance and the application of forceps at the brim, the labour was completed within a very short period of time, and the infant showed no signs whatever of a tedious labour. The cord was perfectly normal in appearance.

On the second night after the birth, August 5th, there was "a large quantity" of bright red blood on the infant's binder. It appeared on that night only, and the nurse noticed that it was coming not from the cord, but from the navel at the side of the cord.

Two days after this, on August 7th, the child had an attack of diarrhœa, and there was a good deal of blood in the motions on the napkins. It was observed, however, that this blood was coming from the urethra. When I was informed of this, I asked the nurse to pay particular attention to the source of the blood and the circumstances of the bleeding. On August 8th the bleeding was reported to be "very bad"; about two teaspoonfuls might come at a time; the blood always appeared at the same time as the bowels moved; it was of a bright red colour, and invariably came from the urethra. Examination of the vulva showed that all the external parts were normal; there was no

sign of inflammation or irritation of any sort. The bleeding decreased as the diarrhœa abated, and it ceased entirely on August 9th. On that day too, six days after birth, the cord came away.

Considering the relation of the umbilical cord to the umbilical arteries and the urachus, and considering that the arteries and urachus do not close, even in normal cases, till from two to five or seven days, I believe there can be little doubt but that bleeding took place from the patent hypogastric arteries,[1] at first through the umbilicus, and later, when that outlet had closed up, through the urachus into the bladder. One can easily understand how hæmorrhage should occur coincidently with or immediately subsequent to the moving of the bowels, only a small quantity of blood appearing in the urine.

I ought to state, in order to make the record of the case as complete as possible, that the infant was strongly suspected by the mother to be "over time" by about three weeks. The development of the infant—it weighed nine pounds—gave an air of probability to the mother's suspicion. The presentation was cephalic; the position was O.R.P.

This case, as I have said, is of considerable clinical importance. No ordinary text-book of surgery or of diseases of children, so far as I am aware, makes any reference to the urachus as a possible source of, or a highway for, blood; and bleeding by way of the urachus has to be added to the possible causes of hæmaturia. As to whether this is an instance of an extremely rare type of case I am quite at a loss to say; but I suspect that if blood were found in considerable quantity on an infant's nursery napkin it would naturally, and without hesitation, be regarded as coming from the bowels, not from the bladder, and especially so if there were coincident diarrhœa.

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*Dr Ballantyne* felt somewhat reluctant to accept the explanation of the origin of the blood given by Dr Ramsay Smith, but in the circumstances it was difficult to think of a more feasible one. He wondered whether there might not have occurred during labour some slight internal laceration, from which blood may have passed intermittently into the bladder or urethra. The case was quite unlike any that he had ever seen or read about, and he thought they were indebted to Dr Ramsay Smith for having put it upon record.

*Dr Smith* replied that there was nothing in the labour, nor were there any after-symptoms to suggest internal laceration, and that all the circumstances of the case pointed to the explanation he had given as being the only likely one.

[1] There is a possibility that it might have occurred from the umbilical vein, but I believe this is unlikely.

## VII. A CASE OF PUERPERAL ECLAMPSIA.

By J. W. Martin, M.D., F.R.C.P.E., etc.

Mr President and Fellows,—The case which I bring before you to-night is one of puerperal eclampsia. I trust that the details of this case will be interesting to those of you who have already met with similar ones. The occurrence of puerperal eclampsia is sufficiently rare to permit of its being brought up as a separate item.

J. W. or D., aged 21, by occupation a mill-worker; married; primipara. I was sent for on Tuesday morning, Nov. 15, 1892, and found her in labour. I learned that she was having fits, and that she had fallen on the floor at 8.15 A.M., when the labour pains first occurred.

*Previous History.*—For the last four years the patient has complained of an almost continuous severe headache and giddiness. She had been treated for this in Belfast, but it was not quite cured. The headache used to be especially bad in the morning. The patient felt useless and unfit for work until she had had her morning tea. She has never previously suffered from a fit. A few days ago she noticed that her legs and ankles were swollen. For some time she has complained of considerable pain in her left shoulder, so severe that her husband has had to hold her for two or three hours at a time. She often said on these occasions, "My left lung is gone,"—a phrase to express the pain she felt. During her pregnancy she suffered considerably from vomiting. Her circulatory system appears to have been healthy. The patient never suffered from either rheumatism, gout, or syphilis, but she had smallpox in Leith when a girl, and her face was pitted. Formerly her digestive system was good. Her social condition was comfortable, and she was scrupulously clean. She has always been temperate and cheery, and was fond of singing.

*Family History.*—Patient's father is alive and well. Her mother, who is in advanced years, suffers from cough and rheumatism; she complains of swollen and painful legs. Patient has four sisters; three are healthy, but one, who lives in Edinburgh, is peculiar. She is suspicious, takes strange notions, hears noises in the house, etc., but she does not suffer from headache.

*Menstrual History.*—This was not ascertained, but the patient never suffered from discharges. Her digestive system was often impaired, notably the last nine months. She is strong, robust, weighs over 12 stones, and is well nourished.

*History of the Attack.*—On arriving at the house I found that the first stage of labour was in progress. When she got up in the morning she complained that everything was dark, and she fell on the floor and the pains came on. The patient was not perfectly conscious. The pains were frequent and good. As soon as possible I ruptured the membranes, and the head engaged at the brim. Thereafter, as the patient was in great distress, and the

premonitory symptoms of a fresh seizure manifested themselves, I put her under chloroform and applied the axis-traction forceps, delivering a full-term healthy female child. The third stage of labour was normal; the uterus was firmly contracted, a binder was applied, and then the perineum, which was torn, was repaired. By this time it was 11.45 A.M.

The subsequent history of the case relates to the fits and their termination. Up to the time of the termination of labour the patient had had five fits. During the afternoon and evening she had thirty. They occurred every sixteen or seventeen minutes. Various remedies were employed. Chloroform was invariably administered to control each fit. Before labour was completed, and also between the fits, chloral hydrate was given in 15-grain doses, and subsequently half-drachm doses of bromide of potassium as well. After the completion of labour an enema of castor oil and 15 grains of chloral hydrate was administered, and resulted in a copious watery evacuation. Hot poultices were applied to the lumbar region, and hot cloths over the heart. The patient was bled to a small amount from the left arm. The blood was clotted. Spirits of sweet nitre, hyoscyamus, and elaterium (¼ gr.) were administered by the mouth. In the evening a quarter of a grain of morphia was twice injected subcutaneously, also pilocarpine. 24 ounces of albuminous urine were drawn off. The temperature at 10 P.M. was 105; the pulse was very rapid and intermittent. From 10.20 to 12.20 the patient had no fits, but at a quarter to 1 A.M. a very violent fit occurred. It was so severe that the patient had to be held down, and chloroform was again administered. Another fit occurred in fifteen minutes. After three-quarters of an hour's interval the fits recommenced, and occurred every twelve minutes. The last took place at 7.30 A.M. and lasted a quarter of an hour. During the whole of the night the breathing was stertorous and laboured, and the patient foamed at the mouth, and it was churned from her nostrils. During the last six or eight hours of the patient's life Cheyne-Stokes respiration was very marked. Only once, at about 4 A.M., the patient appeared to regain consciousness for a moment, and exclaimed, "Oh, God!" Death took place at three minutes to 8 A.M. She apparently suffered no pain, but passed quietly away.

*Description of the Fits.*—During the fits the patient stretched herself, and her right arm was raised above her head. The fingers of the right hand were partially clenched. During some of the fits she tried to bite, but more usually she foamed at the mouth. Her face was swollen. Sometimes she screamed and cried out. In the delirium she used foul language. Her breath had no peculiar smell. The pupils were markedly contracted throughout. At death the right eye was noticeably turned upwards.

During the first fit, after midnight, the patient was very pale, but subsequently reaction came on and her face was flushed. The

skin, especially of the forehead on the left side of the head, was covered with a clammy sweat. On the application of refrigerant lotions to her head she moved it from side to side only, as if conscious of them. At 5.55 A.M. her moans were so loud that they were heard by persons living two flats above her. Unfortunately no post-mortem examination could be obtained.

Before giving pathology of the disease and remarks, let me record one other cause mentioned.

Authorities differ as to causation of puerperal eclampsia. It may be due to plethora, to albuminuria, or, according to Frerichs, it may be due to toxæmia. Sir James Simpson thought it was caused by some alkaloid circulating in the blood. Others think that it is due to cerebral anæmia which is present in the pregnant condition. There is increased arterial tension, which is rendered more marked by the restlessness of the woman in labour and her efforts of straining during a pain. Hence there may be temporary hyperæmia succeeded by serous suffusion into the brain, followed by pressure on the small vessels, causing more marked cerebral anæmia.

It is found in some cases of puerperal eclampsia that the kidneys have been perfectly normal, and in other cases where we know that uræmia has existed in pregnancy no convulsions have occurred. I believe that there must be some poisonous principle circulating in the blood which acts on the respiratory and other centres at the base of the brain and in the medulla. The fit ceases whenever the brain centres have discharged their energy, which has been liberated by the irritant action of the poison brought to them by the blood. We may ask, Where does this toxic principle arise? It may be that it arises in the kidneys. If so, the disease is of the nature of uræmic poisoning. Be this as it may, however, the nervous ganglia in the uterus and kidneys must be implicated. There may be an excessively anæmic condition of the brain, for it has been found on post-mortem examination that the meninges of the brain are congested, whilst the brain centres are anæmic. The condition of blindness in the morning showed an anæmic state of the visual centre.

The cause would appear to be centric, not peripheral. Certainly various products due to faulty excretion must be circulating in the blood. In this case the amount of urine drawn off was very noticeable, showing that there was excessive secretion. The urine was albuminous. It is noticeable, too, that the feet and ankles were swollen some days before labour set in. The patient's pulse was of high tension. She suffered from Cheyne-Stokes breathing and laboured respiration. In all probability there was renal disease in this case.

The child was of large size, and therefore the opinion may be expressed that the over-distended uterus pressed upon the nerve plexuses governing the secretive functions of the already diseased

kidneys, and therefore the morbid products which ought to have been eliminated were allowed to circulate in the blood. These products, having an affinity for the brain and the higher nerve centres, brought about the convulsions which in this case had a fatal issue.

It appears to me that the case affords a striking example of the helplessness in medicine to meet a condition of such gravity when it arises, and illustrates forcibly that our knowledge of disease is far from being perfect even at the present day.

## VIII. PREMATURE SEXUAL DEVELOPMENT IN RELATION SPECIALLY TO OVARIAN TUMOURS, WITH AN ILLUSTRATIVE CASE OF OVARIAN SARCOMA IN A CHILD OF SEVEN; LAPAROTOMY; RECOVERY. WITH A PHOTOGRAPH, CHART, AND MICROSCOPIC SECTION OF TUMOUR.

By J. HALLIDAY CROOM, M.D., F.R.C.P. Ed., F.R.S.E., Physician to the Royal Maternity Hospital; Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary; Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

PRIOR to a detailed description of the patient under consideration in the present report, it may be of some interest if I place before you a rapid survey of cases of a similar nature which have been recorded.

Precocious menstruation with associated premature sexual development, although by no means unique in its occurrence—as the medical literature of this country, of the Continent, and of America attests—is yet of sufficient rarity to invest it with at least a transient interest to the observer when such an anomaly does present itself.

After a perusal of the available literature at my hand, I have tabulated the cases found recorded under the following heads, and have, where the case seemed one of more outstanding peculiarity, shortly epitomized its history.

1. Precocious menstruation with an early appearance of the external manifestations of puberty.
2. Sexual development without menstruation.
3. Menstruation previous to development of the sexual organs.
4. Early conception and pregnancy.
5. Premature sexual development associated with tumours of the generative organs.

1. One of the most striking cases illustrative of this group is the oft quoted one of De Beau recorded in the *American Medical Journal*, vol. xi., and appearing in the *London Medical Gazette;* to which statement he considered it advisable to append the signatures of four physicians, a mayor, and a British consul.

The history is as follows:—"Matilda H. was born on the 31st December 1829. She came into the world with her mammæ perfectly formed, and the mons veneris covered with hairs, as much as a girl between 13 and 14 years old. When precisely 3 years old, the catamenia made their appearance, and have continued to appear regularly every month until the present time (1832), and as copious as any woman might have them, each period taking 4 days. . . . . Her mammæ are now of the size of a full-grown orange; and the dimensions of the pelvis are, in my opinion, such as to enable her to bear children when 8 years old, and very likely sooner."

In the *Northern Journal of Medicine* for 1845, Campbell reports a case where the catamenia set in a few days after birth, and occurred regularly at periods of 3 weeks and 2 or 3 days. This continued till she died at the age of 4 years. The post-mortem appearance was like that of a girl of 10 or 11, the mammæ and external genitals having the appearances proper to puberty. The development of the pelvis and of all the deep-seated genitals was very considerable.

R. B. Smart, in the *Medico-Chirurgical Transactions* for 1858, gives a table of eight recorded cases, and describes in full detail a case coming under his observation, with two accompanying photographs of the patient. The catamenia in this girl appeared at 3 years and 6 months, and the down on the pubis shortly antecedent to that.

In the *Gazette des Hôpitaux* for November 1876, Bouchat narrates the history of a girl, Nelly O., and the appearance she presented at the age of 4 years. She had been born with the breasts notably enlarged, commenced to menstruate at the age of 22 months, and at the time of examination presented the appearance of puberty as regards her breasts and genitals. Menstruation in her case was very regular in its recurrence, lasting 4 to 6 days, and equivalent in quantity to that of an adult.

In an article on "Early Puberty" in the *American Journal of Obstetrics*, Dr Harris classifies precocious menstruation under two varieties,—1st, Occurring during infancy; 2nd, Between the ages of 7 and 13 years; and records a case coming under his own observation of a girl in whom menstruation appeared at the age of 9½ years, and in whom the other evidences of puberty manifested themselves.

In the *British Medical Journal* for June 1880, C. E. Harle records the result of a post-mortem examination on a child which had commenced to menstruate at the age of 5 months, and this returned regularly till the 14th month, when the child died of diarrhœa. The pudendum was large and clothed with hair; the uterus was large, the os patent and the lips congested, the vessels of the broad ligament were injected, and both ovaries were cystic.

The other cases I have noted under this category are the following:—

| Author. | Menstruation commenced. | External appearances. |
|---|---|---|
| Sir Astley Cooper in *Med. and Chir. Trans.*, 1813. | 3 years. | In breasts, axillæ, and on pubes. |
| Thomas Embling in *Lancet*, 1848. | 2 years. | Mammæ and pubes. |
| Dr Aveling in *Lancet*, 1866, gives a reference list of 16 cases by different observers. | | |
| Prochownik in *Archiv für Gynæk.*, 1881. | 1 year. | In breasts, axillæ, and on pubes. Internal organs not enlarged. |
| Berry in *Medical Press* for 1882. | 5 years 4 months. | Breasts and genitals. |
| A. van Denveer in *Am. Journ. of Obstet*, 1883. | 4 months. | Mammæ greatly enlarged. |
| Four of the following cases are cited by Pozzi in his *Gynécologie.* | | |
| Cabade in *Gaz. Med. de Paris*, 1883. | 8 months. | Rapid development. |
| Wallentin in *Dissert. inaug.*, Breslau, 1886. | 1¼ years. | |
| Casati in *Il. Raccoglitore*, 1886. | 6 years. | Rectal examination, *utérus pubère.* |
| Diamant in *Intern. Klin. Rundschau*, 1888. | 6 years. | Extl. genitals. |
| Jagoe in *New York Med. Journ.*, 1889. | 2 years. | Extl. genitals. |

Table of Cases of Ovariotomy in Infants and Girls under thirteen, mainly from Bland Sutton.

| Reporter. | Age. | Reference. |
|---|---|---|
| Küster. | 1 year 8 months. | *Deutsche Med. Woch.*, 1883. |
| J. F. Hooks. | 2 years 6 months. | *Am. Journ. Obstet.*, vol. xix. |
| Kidd. | 2 years 11 months. | *Obstet. Journ.*, Gt. Brit., vol. viii. |
| Alcock. | 3 years. | *Lancet*, 1871, vol. ii. |
| Schwartz. | 4 years. | *Arch. für Gyn.*, vol. xiii. |
| Thomas. | 3 years 5 months. | *Am. Journ. Obstet.*, 1880, vol. xiii. |
| Thornton. | 4 years. | *Med. Chir. Trans.*, vol. lxx. |
| Boldt. | 4 years. | *Proc. Path. Soc.*, New York, 1888. |
| Mears. | 6 years 8 months. | *Phil. Med. Times*, 1871, Nov. 1st. |
| Ewens. | 7 years. | Unpublished. |
| Thornton. | 7 years. | *Brit. Med. Journ.*, 1881, vol. ii. |
| Lucas. | 7 years. | *Trans. Clin. Soc.*, London, vol. xxi. |
| Halliday Croom. | 7 years. | *Edin. Med. Journ.*, Feb. 1893. |
| Cupples. | 7 years 6 months. | *Richmond and Louisville Medical Journal*, 1875 (see *Edin. Med. Journ.*, vol. xx.) |

*Table continued on next page.*

| Reporter. | Age. | Reference. |
|---|---|---|
| Spencer Wells. | 8 years. | *Brit. Med. Journ.*, 1874, vol. i. |
| Leopold. | 8 years. | *Arch. für Gyn.*, Bd. vi. |
| Chenoweth. | 8 years 6 months. | *Am. Journ. Obstet.*, vol. xv. |
| Peaslee. | 9 years. | *Ovarian Tumours*, p. 59. |
| Malins. | 9 years. | *Lancet*, May 1890. |
| Dickinson. | 10 years. | *Trans. Path. Soc.*, vol. xxv. |
| Wagner. | 10 years. | *Arch. für Klin. Chir.*, Berlin, 1884, vol. xxx. |
| Emmet. | 10 years. | *Am. Journ. Obstet.*, vol. xiv. |
| Halliday Croom. | 11 years. | *Obstet. Trans.*, Edin., vol. xiv. |
| Jouon. | 12 years. | *Gaz. Heb.*, 1869. |
| Barlow & Marsh. | 12 years. | *Clin. Trans.*, London, vol. xi. |
| Keith. | 12 years. | *Brit. Med. Journ.*, 1878, vol. ii. |
| Lee, Robert. | 12 years. | *Medico-Chir. Trans.*, vol. xliii. |
| Griffiths. | 12 years. | *Trans. Path. Society*, London, vol. xxviii. |
| Schultze. | 12 years. | *Deut. Zeitsch. für Prakt. Med.*, 1876. |
| Wegscheider. | 12 years. | *Beiträge z. Geburt. u. Gyn. der Geburt. Ges.* in Berlin, 1870. |

2. The indication of a sexual prematurity, as manifested by the outward signs on the breasts and pudenda, unaccompanied by a menstrual discharge, is unusual. Few instances of this have been noted, but that described by William Cook in the *Medico-Chirurgical Transactions* for 1813 is distinctive enough.

"Louisa Flux was born in 1802. Up till her fourth year she was remarkably thin, but apart from this there was no abnormal feature. The external pudenda now became prominent and covered with a quantity of dark hair. Within four months of her death, which occurred on October 1st, 1809, she began to suffer from convulsions, after which she increased enormously in weight, and her complexion became florid. Her cheeks were downy, and her lip was covered with so much hair that it might be said she had a beard. Her voice, formerly shrill, now became strong, and her whole contour was that of puberty except the breasts and the general stature. The post-mortem appearance: No change had taken place in the internal organs of generation, the ovaries and uterus not having received that increase of size which is usual at puberty. The mons veneris and labia pudendi were as prominent as at perfect puberty, and covered with long, black coating hairs. Menstruation had not taken place."

3. Menstruation occurring without any change in the genitals is not so unusual as the preceding, but even thus it is rare for a child to have the catamenia established for a period of years without other phenomena presenting themselves.

Pozzi in his *Gynécologie* cites Bernard's case reported in the *Lyon Médical*, 1887, of a girl who menstruated regularly from birth

up to the age of twelve years without any development of her external genital organs.

In the same class may be included those cases noted by the following authors:—

Allbut in the *Royal Med. and Chir.*, 1866, where the menstrual discharge occurred periodically until the youthful patient died of exhaustion.

Clarence Harding in the *Lancet*, 1879, reports that in a family of two daughters both suffered from a periodic discharge, hæmorrhagic in character, and in the elder of whom the discharge vanished, only recurring when puberty was established.

4. Many remarkable instances of early pregnancy have been put on record by trustworthy authorities, the majority of which cases in this country have occurred after the age of twelve.

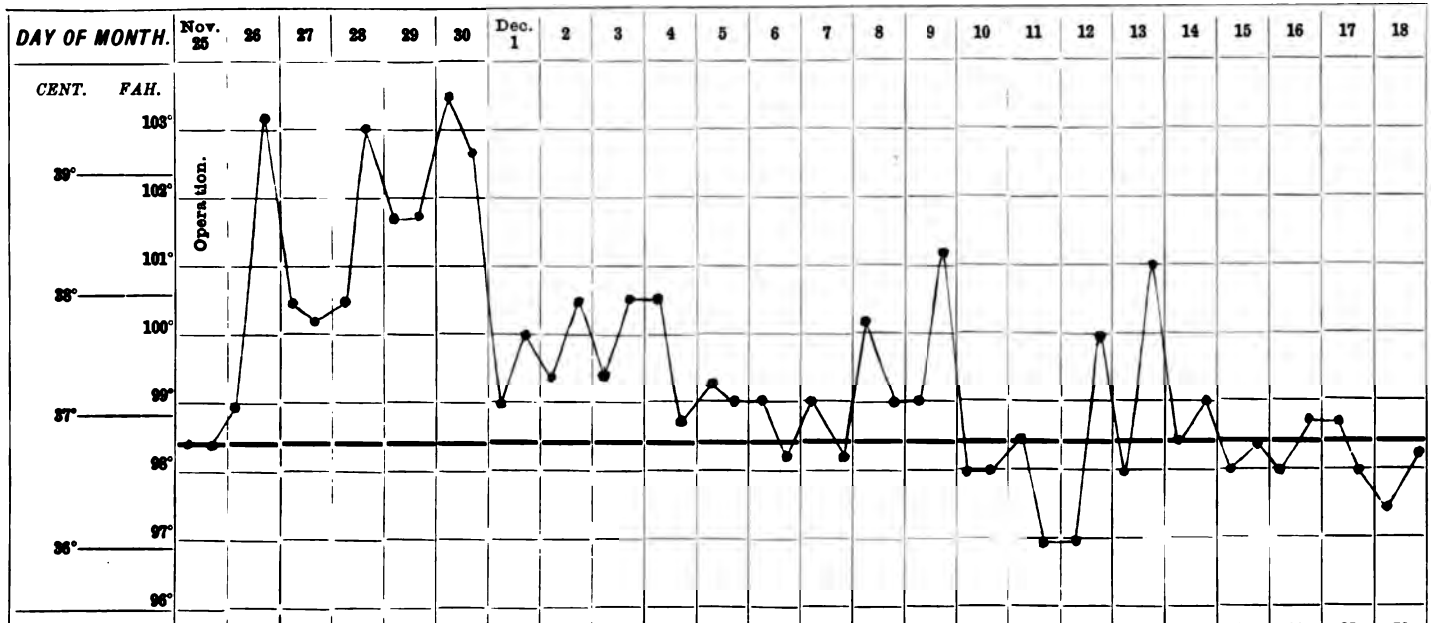
There is, however, in Continental literature no great scarcity of pregnancies reported as occurring at a much earlier period.

The following table of cases which I have collected from various sources has been arranged in precedence of age. The majority at least bear evidence of being reliable.

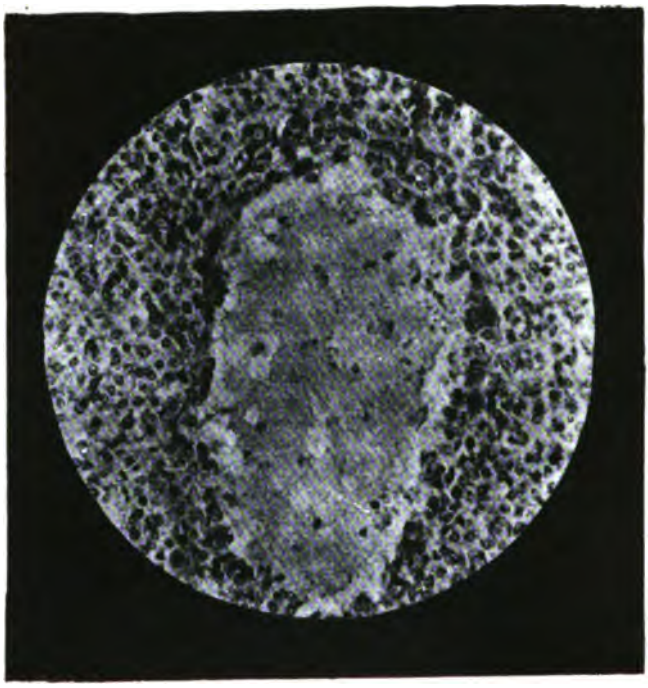
| Author. | Reference Work. | Development. | Menstruation. | Impregnation. | Delivery. | State of Child. |
|---|---|---|---|---|---|---|
| Müller. | *Cyclop. of Obst. and Gynec.* | Excessively at birth. | 2nd year. | 8 years. | Instrumental, 8–9 months. | Dead. |
| Schmidt. | *Essais Historiques*, 1779. | Sexual organs developed. | 2nd year. | .. | 8 years 10 months. | Full term, dead. |
| Bodd. | .. | .. | 1 year irregular, 7 years regular. | .. | 8 years 10½ months. | .. |
| Molitor. | .. | Hair on pubis at birth. | 4th year. | 8 years and 3 months. | Premature, 5th month. | Fœtus—a 3 months'. |
| Dodd. | *Lancet*, 1881. | Pubes and axilla covered with hair. | 12 months. | 8 years and 10 months. | .. | Weighed 7 lbs. |
| Rowlett. | *Trans. Med. Jour.* | A few weeks after birth. | 12 months. | 9 years and 3 months. | 10 years. | 7¾ lbs. |
| Bayliss. | *Brit. Med. and Surg. Jour.*, 1846. | .. | 9 years and 10 months. | .. | 10 years and 8 months. | Alive, weighed 8 lbs. |
| Roberton. | *Midwifery.* | .. | .. | 12th year. | 12 years and a few months. | .. |
| Smith. | *Lond. Med. Gazette*, 1848. | No history. | 10 years. | 11 years. | 12½ years. | Fully developed. |
| May. | *Lancet*, 1880. | .. | Once before conception. | .. | 13 years. | Well developed. |
| Heywood Smith. | *Brit. Med. Jour.*, 1881. | .. | 12 years and 6 months. | 12 years and 8 months. | 13 years and 4 months. | .. |
| Wilson. | *Edin. Med. Jour.*, 1861. | No precocity. | .. | 12 years and 9 months. | 13 years and 6 months. | Full grown. |
| Chapman. | *Assoc. Med. Jour.*, 1856. | .. | .. | 13 years and 1 month. | 13 years and 10 months. | Full grown. |

*Records of Temperature, Pulse, Respiration, and Stools, from 25th day of November 1892,*

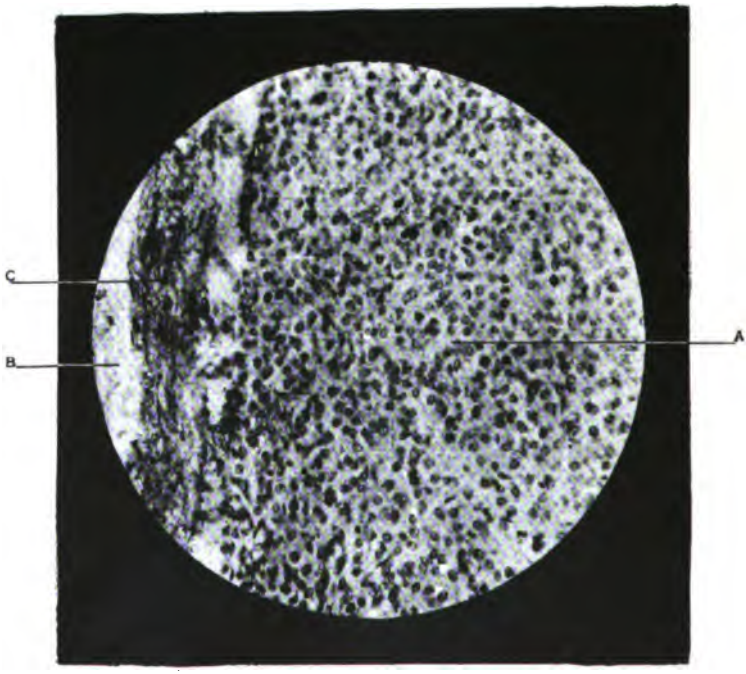
*In the Case of M. N., aged 7.*




| DAY OF MONTH. | Nov. 25 | 26 | 27 | 28 | 29 | 30 | Dec. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PULSE. | 96 | 104 | 112 | 120 | 120 | 140 | 120 | 108 | 104 | 100 | 94 | 92 | 86 | 90 | 76 | 94 | 80 | 76 | 82 | 90 | 80 | 90 | 85 | 76 |
| RESPIRATION. | 30 | 34 | 29 | 34 | 40 | 30 | 28 | 27 | 30 | 26 | 20 | 20 | 20 | 24 | 21 | 22 | 23 | 26 | 20 | 20 | 20 | 20 | 20 | 20 |
| STOOLS. | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 |



PORTION UNDERGOING MUCOID DEGENERATION.




A. ROUND SARCOMA CELLS.

B. GRANULAR, WITH HERE AND THERE SLIGHTLY FIBRILLATED INTERCELLULAR SUBSTANCE.

C. FIBROUS SEPTUM.

5. It has been asserted that among the causes tending to produce changes in the sexual apparatus peculiar to puberty we should include neoplasms affecting, or related to, the internal generative organs. This would appear, however, to be far from the usual rule, and rather the exception. With a view to ascertaining the frequency of this occurrence I have examined the records of twenty-six laparotomies performed on children under puberty, and in one case only does there seem to have been signs so marked as to arrest the attention of the operator so far as to give a description of the child's appearance. On this occasion the narrator and operator was Mr R. Clement Lucas.

Besides this, Dr Keith remarks regarding one of his patients, a girl of 13, that she was very tall, and had an unusually large quantity of black hair on her head, about the genitals, and on the pubis. She had never menstruated. Mr Lucas gives his report in the *Clinical Society's Transactions* for 1888.

The child was aged 7, and had had a hæmorrhagic discharge from the vagina, which recurred whilst she remained in hospital. The mammæ were firm and about the size of oranges, the mons veneris of unusual elevation, and covered with hair about 1 inch in length. There was a tumour of the right ovary, which was removed, and the child made a good recovery. The vaginal discharge disappeared and the mammary prominence subsided before leaving hospital.

The case which formed the basis of this paper was sent to me by Dr Forsyth of Eyemouth. Her history was as follows:—She was a child of 7 years of age, suffering from a large abdominal tumour. Previous to March of this year she had been perfectly well, presenting no abnormal symptoms whatever. In this month she was raped by a boy on several occasions. Immediately thereafter she had a profuse hæmorrhagic discharge from the vagina, which continued almost uninterruptedly until her admission to hospital in the month of November, viz., seven months. Shortly after the rape her abdomen began to swell and gradually enlarged, until on her admission to my ward she had a tumour about the size of a seven months' pregnancy, with the following measurements,—vertical 7½ inches, transverse 7¼, left oblique 8, right oblique 7½.

The impression on her admission to hospital was, that the tumour was a pregnancy, notwithstanding her extreme youth, and this was very considerably emphasized by the fact that her mammæ were largely developed, that there was a well-marked linea nigra passing from the umbilicus to the pubis, that there was a copious development of hair over the mons veneris and the external surface of the labia majora, as shown in the accompanying Illustration, and that a well-marked bruit could be heard on both sides of the tumour.

The tumour was freely movable, tense, and firm, but had appar-

ently no intimate connexion with the pelvis. This want of connexion with the cavity of the pelvis, as well as its absolute solidity, notwithstanding the apparent indications otherwise, decided me against the possibility of pregnancy. Under anæsthesia, therefore, I examined the patient per vaginam, and found the remains of the hymen thick, but completely penetrated, the vaginal walls being smooth, and the cervix enlarged, very soft, and somewhat patulous. The sound was then introduced into the uterus, which was found to be enlarged, being slightly over 3 inches. This manipulation caused free hæmorrhage. The possibility, then, of pregnancy in a bi-horned uterus naturally presented itself; but a prolonged examination of the patient—by no means an easy matter in a child—satisfied me that the tumour was unconnected with the uterus, as this organ could be mapped out bimanually, and the conclusion arrived at was that it was a pediculated ovarian.

In considering the question of pregnancy the pelvic measurements were taken, and found to be—

| | | |
|---|---|---|
| Interspinous, | 8 | inches. |
| Intercristal, | 8¾ | „ |
| External conjugate, | 6¼ | „ |

It is specially noteworthy that the development of her pubic hair, the uterine hæmorrhage, and the growth of the abdominal tumour, as well as the appearance of the linea nigra, were all phenomena entirely subsequent to the interference with her genital organs, and therefore apparently consequent upon her rape. In the same connexion it is well to observe the mother's statement, that the mammæ were enlarged to such an extent at birth that the development of mammary abscesses was feared. This goes far to show that the child had a tendency to precocity in development which only required the stimulus of the repeated sexual acts to mature the activity both of the uterus and ovaries. Her mental development was rather under average.

The operation was undertaken on the 25th November. On cutting through the abdominal parietes the bluish surface of the tumour at once indicated its true character. There was some degree of ascites. The tumour was aspirated, but only a small quantity of sero-sanguinolent fluid was withdrawn. There were no adhesions, and the tumour was perfectly free in every direction. The abdominal incision had to be enlarged up to within 1½ inches of the ensiform cartilage, owing to the fact of the tumour being absolutely incompressible. It was removed through the abdominal wound, and found to be attached to the left side of the pelvis by a long pedicle, which was secured in the ordinary way. The Fallopian tube was greatly distended and tortuous. The ovary on the opposite side was quite small and undeveloped. The tube on the same side was hypertrophied. The uterus was enlarged,

corresponding to the dimensions indicated by the sound previous to operation. The abdominal wound was closed, and the child made an uninterrupted recovery. The accompanying Chart will show the usual temperature curve in ovariotomy performed on children.

The tumour weighed over six pounds. Its surface was smooth and soft, and its walls were very vascular. In its substance were a number of cysts separated by loose septa, which were very fragile. The cystic contents were grumous or gelatinous and transparent fluid. The microscopic appearances were those of a rapidly growing round-celled sarcoma with mucoid degeneration of parts, which the accompanying Micro-photographs sufficiently delineate.

On the 11th January 1893, and subsequent to the reading of this paper, the child was examined under chloroform before dismissal from hospital. The mammary outline is much less distinct, and the dark areola has somewhat faded. The linea nigra is less distinct, but there appears to be rather an increase of hair on the pubis. The labia minora, which had been large and dark, have now assumed a normal size and colour, and are less gaping; while the vaginal mucous membrane, previously dark and injected, has become of a normal pinkish colour. On vaginal examination the cervix is found to be small and closed, and to have resumed its infantile form. The sound now only enters to the extent of two inches, being a full inch less than before operation, and there is no hæmorrhage from the vagina.

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*The President* said that Dr Croom's communication was instructive and interesting, both because of the history of this rare case which he had so successfully treated and so clearly recorded, and also because of the trouble he had taken in classifying the different conditions under which premature menstruation was met with, and citing illustrative cases. He (the President) had never met with any clear case of its occurrence, and was glad to have had the opportunity of hearing Dr Croom's valuable paper.

*Dr Ballantyne* commented on the extreme rarity and great interest of the case that had been so well placed before them by Dr Croom. He thought it would be interesting to know whether the boy who had connexion with the patient showed also any signs of premature sexual development and precocity. The medico-legal interest of the case was not less than the obstetrical.

*Dr Croom* replied.

MEETING III.—JANUARY 11, 1893.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr Haig Ferguson* showed some PHOSPHATIC CALCULI passed per urethram, in which the nucleus of the largest was formed by a silk ligature. The patient fully a year ago had her ovaries and tubes removed by abdominal section. There had been long-standing pelvic inflammation, as a consequence of which there were dense adhesions, and much difficulty was experienced in completing the operation. Some months thereafter symptoms of pelvic abscess developed. The abscess first ruptured into the rectum, but after a time the rectal opening closed up, and it was then punctured per vaginam. The patient's condition was much improved after this, but soon afterwards great vesical irritation developed, with pus in the urine. Some small phosphatic calculi about the size of millet seeds, many of which had sharp spike-like projections, were subsequently voided spontaneously. As, however, the irritation still continued, Dr Ferguson dilated the urethra, with the result that the largest calculus, which he showed, was got rid of, having as its nucleus one of the silk pedicle ligatures used in the abdominal section a year previously. Since then the patient has done well.

II. *Dr J. W. Ballantyne* showed—(1.) A specimen of CYSTS ON THE FŒTAL SURFACE OF THE PLACENTA. He had obtained the placenta from a recent confinement case. The mother was 35 years of age, an viii.-para, and suffered from epileptic attacks. The labour was rapid and natural. The child was a well-developed male, and had the cord twisted once round the neck. It was born living, and is now alive and well. The placenta came away, but the membranes were retained, and during the process of separation they were torn in great measure from the after-birth. During the extraction of the placenta he noticed that on its fœtal surface were two cysts, each about the size of a greengage. A more detailed examination of the after-birth revealed the following characters:—It was nearly circular in form, measured about 17·5 cms. in diameter, had a circumference of 53 cms., and a thickness of 2 cms. The umbilical cord was nearly centrally inserted, and had a total length of 70 cms. (nearly 27·5 inches). Quite close to the insertion of the cord, and on the fœtal surface of the placenta (from which the amnion was detached) were two large and one small cyst. The two large ones measured 5·5 by 2·3 cms. and 5 by 2·5 cms. respectively, whilst the small one was scarcely 1 cm. in length. When the specimen was fresh the cysts appeared to contain a slightly opalescent, pale yellow fluid, and on the surface of both the larger ones could be seen a very fine bloodvessel.

Passing between the two large cysts was one of the principal branches of the umbilical vessels.

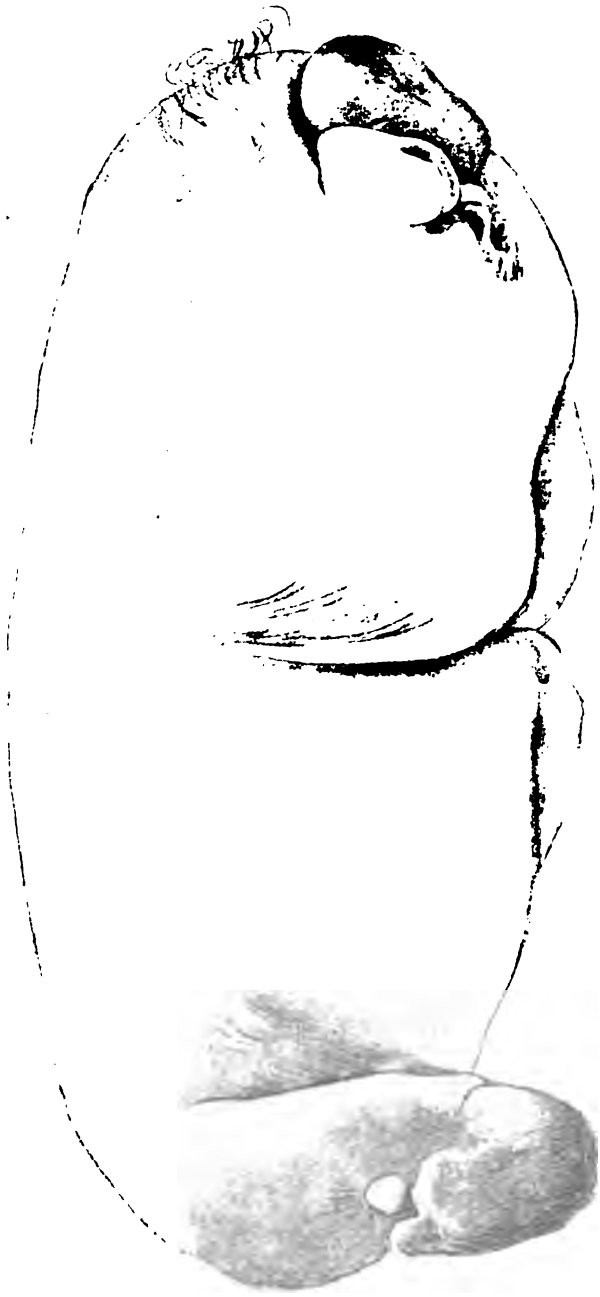
(2.) AN ABORTION-SAC, which had been sent to him as a probable example of *retarded development of the embryo.* Dr J. D. Williams of Dowlais, to whom he was indebted for the specimen, had kindly furnished the following interesting history:—Mrs E., 32 years old, has been married for ten years, is the mother of three children, and has had in addition four miscarriages. The menstrual flow first appeared at the age of 13, and has been regular. Her *first* pregnancy terminated at the full term in the birth of a female infant (seventeen months after marriage); the *second* ended in an abortion at the third month from the date of menstrual cessation, and the degree of development of the fœtus, membranes, and placenta corresponded to the calculated time of gestation. The *third* pregnancy went to the full term, when a female infant was born. The *fourth* went to the eighth month from the date of catamenial cessation, when the uterine contents were expelled. The fœtus (a male) was no larger than one at the fourth month of intra-uterine life, and in other details corresponded to a fœtus of that age. It was in a macerated state, but there were no signs of putrefaction. The mother had suffered from ill health (loss of appetite, weakness, etc.) for two or three months immediately before the emptying of the uterus. The *fifth* gestation, like the first and third, went to the full time, when a daughter was born. The *sixth* ended prematurely, like the second and fourth. It specially resembled the fourth, for, at the end of the eighth month of menstrual cessation, a dead male fœtus no larger than one of four months' development was expelled. Her last catamenia occurred in the beginning of August 1891. About Christmas she experienced what she calls a peculiar change coming over her; and from that date she was in bad health till the uterine contents were expelled on 23rd April 1892. The abortion-sac was intact when expelled. On opening it about 2 oz. of turbid, yellowish-brown, odourless liquor amnii escaped. The fœtus was of the size reached at the fourth month; the male sexual organs were clearly recognisable; its skin was white and sodden; the joints were loose and the limbs very flabby. The fœtal half of the umbilical cord was thin, being little more than a thread; but the placental half was thick, swollen, and gelatinous. The amnion was grayish-brown in colour, and presented, towards the placental attachment of the cord, a number of isolated, pinhead-sized, grayish points. In the substance of the placenta there were two hæmorrhages, each measuring about 1 cm. in diameter. Some of the cotyledons were fibrous. The *seventh* pregnancy came to an end on 2nd December 1892. She had last menstruated on the fourth week of August, and the age of the gestation was therefore about three months. The membranes were not intact when the abortion was expelled, but every piece of bloodclot was carefully examined and no fœtus found. The

abortion was of the size of a hen's egg, and had an amniotic cavity which was certainly not large enough to contain a fœtus of the size usually attained at the third month. Several hæmorrhages were found in the decidua serotina now developing into the placenta; some of these were recent, others were of older date and fibrous in character. Inside the amniotic cavity of the ovum was seen the somewhat swollen umbilical cord; it was 4 cms. in length, and showed at its free end a curved grayish structure about 4 mms. in length, which Dr Williams thought might be the embryo retarded in its development. Dr Ballantyne was inclined to regard it as the torn end of the cord, and to consider that the embryo had passed away with the liquor amnii when the abortion took place. A microscopic examination would be necessary to settle the matter. Whether or not the case turned out to be one of delayed fœtal development, it was of interest from the clinical standpoint. The mother, who was neither syphilitic nor tubercular, had had full-term labours and abortions alternately; all the full-time infants were females, all the aborted fœtuses were males. It would perhaps be paradoxical to speak of her case as one of "habitual alternating abortion."

(3.) A FŒTUS WITH THE ERUPTION OF MEASLES, which had been kindly given him by Dr T. B. Darling, in whose practice it occurred. The mother had not suffered from measles previously, but at the end of the fifth month of her first pregnancy she took the infection, and when the eruption was beginning to fade gave birth to this fœtus. Several spots were to be seen on the fœtus (a male), especially on the face, back, and legs. The fœtus was alive when born, but it was premature and did not survive. The mother did well.

(4.) A FŒTUS WITH GENERAL DROPSY, which he had received that afternoon from Dr J. D. Williams of Dowlais. The mother was 28 years old, and had had five children and one miscarriage (at the tenth week). She was married when hardly 18 years of age. The child was born on the night of the 8th inst. Premature labour had been induced on the night of the 7th by means of Barnes' bags. The membranes were ruptured on the 8th, and one hour afterwards the child was born. Labour was induced on account of general distress caused by the excessive distention of the maternal abdomen, which was rapidly increasing. Three and a half quarts of liquor amnii escaped when the membranes were ruptured. The dropsical infant, a male, weighed 6 lbs., had a distended abdomen, and an anasarcous integument. The placenta weighed 2 lbs., was very friable and œdematous, and showed two small hæmorrhagic infarcts. The umbilical cord was 11 inches long.

III. *Dr Millard* showed—(1.) AN AMORPHIC FŒTUS expelled during the third stage of labour, a report of the dissection of which would be made at a future meeting; and (2.) A NEW PESSARY for prolapse of the uterus.



NEPHALIS ENLARGED 1/3

IV. *The President* showed a very typical specimen of GENERAL FŒTAL DROPSY, a report of the dissection of which would be made at a future meeting of the Society. The specimen had been sent to him by Dr Mann of Ashton-under-Lyme.

V. *Dr J. Haig Ferguson* read the first half of his paper on UTERINE ROTATION; ITS CLINICAL IMPORTANCE IN PREGNANCY AND LABOUR. The discussion was postponed till the reading of the rest of the paper.

## VI. NOTE OF A CASE OF ACEPHALIC ACARDIAC FŒTUS.

By J. HALLIDAY CROOM, M.D., F.R.C.P. Ed., F.R.S.E., Physician to the Royal Maternity Hospital; Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary; Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

THIS fœtal monstrosity, whose external appearance is well represented in the accompanying Drawing, I had sent to me some little time ago. It consisted of a somewhat oval trunk, to the narrow end of which was attached a rudimentary distorted lower right extremity with no semblance whatever of a head. The trunk was not bilaterally symmetrical, the side to which the rudimentary extremity was attached being rather the larger. On its anterior and lateral aspects the trunk presented a transverse groove about its middle; three-quarters of an inch above this groove the umbilical cord was attached, while extending upwards for about two inches beyond was a thin membrane, under which the appearance presented considerable difference from that of ordinary skin.

From the circumference of this surface the membrane projected outwards, terminating in a free edge. This was, in all probability, the wall of a ruptured serous sac. Half an inch below the transverse groove, a small nipple-shaped body formed a projection of the size of a large pin's head, being surrounded by a circular groove.

On the right side of the upper end of the trunk there were two rounded sessile projections—one, the external and smaller, being covered by ordinary skin; the other having a wrinkled integument of a purplish tinge. Immediately in front of these were situated five conical bodies, the largest of which was scarcely a quarter of an inch in length, and which, from their relative positions, appeared to represent a rudimentary thumb and four fingers. On the posterior surface, for about an inch below and behind the projections just described, the integument was covered with a quantity of hair.

On palpation the tissues beneath the skin were firm and resistant, while here and there bony outlines could be detected.

*Dissection.*—The skin on the anterior wall of the trunk, from a little below the transverse constriction nearly to the lower end, was removed in the form of flaps, and exposed a quantity of gelatinous-

looking tissue, with here and there a little yellow fat interspersed. This tissue was three-eighths of an inch in thickness, and from it there oozed a quantity of watery fluid. Under it were exposed a number of muscular fibres having a longitudinal and oblique direction, and on tracing them down they were found to extend on to the base of the limb. The joint at this site where the limb joined the trunk was opened, and found to be that of the knee. The transverse line, previously described as being on the trunk, represented the junction of thigh with trunk.

On reflecting the skin between the umbilicus and the transverse groove a quantity of subcutaneous œdematous tissue was removed, and what appeared to be pelvis and lower ribs could be felt. When reflecting the skin on the left side of the umbilicus a delicate membrane was exposed, which was divided, and a cavity was thus opened into. In this cavity a piece of intestine was exposed, which appeared to commence blindly by a rounded extremity. It then formed a loop, having its convexity upwards and to the left, afterwards passing downwards. Throughout its extent it was connected to the posterior abdominal wall by a kind of mesentery. It was altogether only an inch in length, and was of uniform calibre. The abdominal cavity on both sides was occupied by loose fibrous tissue, with a number of spaces between. On the left side was an elongated body of about three-quarters of an inch in length adherent to the abdominal wall, and having its long axis in the line of the body.

The back of the thigh was found on dissection to form the lower part of the anterior surface of what had first appeared to be the trunk. At the juncture of the thigh and trunk there was a bony prominence to which muscles were attached both above and below, and from it also ligaments, tendons, and membranes arose. The biceps, with one head arising from the bony prominence, and the other from what appeared to be the side of the sacrum, the hamstrings, sartorius, a muscular mass representing psoas and iliacus, could all be made out. On reflecting the mass of psoas and iliacus a stout fibrous capsule was exposed, and when this was opened there appeared a bony structure, evidently the head of the femur, but no corresponding acetabulum was present.

The gracilis, rectus, and adductors, were then made out and reflected, but no appearance of Hunter's canal, or femoral vessels could be discovered in their normal position. The other muscles could now be distinguished mainly taking origin from the side of a bony mass which seemed to represent the sacrum. The anterior crural nerve passed out of the abdominal cavity over the head of the femur, whilst the gluteal and sciatic vessels passed over the obturator internus. The capsule of the hip-joint was very thick, and there was a band representing the ligamentum teres.

*Skeleton.*—There was no appearance of a skull; the prominence corresponding to the position of the cranium was found on dissec-

tion to be composed merely of skin covering a dark-coloured pulpy substance, which communicated with a similar substance found in the vertebral canal. At the upper part of the spinal column were found large bony masses, irregular in shape, and perforated by a foramen for transmission of a structure representing the spinal cord. These bones occupied the whole of the cervical region. The dorsal region seemed to be represented by four vertebræ, the bodies of which were well developed. These had transverse and spinous processes, and the laminæ were broad, but did not overlap. Attached to the vertebræ on the left side were seven ribs, the four upper being ossified together, while the remaining three were loose. On the right side there were four ribs ossified in pairs. They had very little curvature, and were not united to those of the opposite side. On removing them there was found to be a large general cavity, in which were vessels from the umbilicus—two arteries and a vein—but no trace of a heart could be seen. The ribs were connected anteriorly by muscular fibres to the bony mass in front of the pelvis. On the right side, corresponding in position to the arm, lay a piece of partially ossified cartilage bound to the ribs.

In the position normally occupied by the pelvis was an irregularly-shaped bone, with its posterior half concave, and having on the upper border a depression for articulation with lumbar vertebræ; on the inferior border were two prominent tubercles.

The labour had taken place as an abortion without further complication, and, unfortunately, when sent to me the umbilical cord and placenta were awanting.

## VII. THE ANATOMY OF ADVANCED PREGNANCY IN *MACACUS RHESUS* STUDIED BY FROZEN SECTIONS, BY CASTS, AND MICROSCOPICALLY.

By D. Berry Hart, M.D., F.R.C.P.E., F.R.S.E., and G. Lovell Gulland M.D., F.R.C.P.E.

A few months ago we were fortunate enough to obtain a *Macacus Rhesus* in an advanced state of pregnancy. Much work has been done recently in regard to pregnancy in apes by W. Turner (17), Waldeyer (18 and 19), and Selenka (13), so that we were anxious to fill any gap in our knowledge rather than to follow in the path already so ably and accurately explored by these investigators. Thus it seemed to us that one could accept unhesitatingly what Turner and Waldeyer have told us about the intervillous circulation in the advanced placenta of apes, as well as the dissectional anatomy of Breschet (1) and Selenka.

We therefore determined to investigate in the first place the frozen sectional anatomy of this specimen, to take casts of the uterine cavity and fœtus, and to examine the microscopic structure

of the placenta. Dr Gulland gave the warning, indeed, that the tissues would be less fitted for microscopical investigation; but though the microscopical sections are less perfect than one could wish, they are definite enough for practical purposes.

The ape was accordingly chloroformed, and, when dead, placed in a freezing mixture for several days; it was then sawn mesially and drawn. While still frozen, the fœtus and liquor amnii were lifted out and casts taken of the uterine cavity and fœtus. Portions of the placenta and uterine wall were then hardened, and afterwards cut in paraffin.

We now purpose considering—

I. *The general Anatomy of the Specimen so far as it bears on Pregnancy.*

II. *The Uterine and Fœtal Casts.*

III. *The Microscopical Structure of the Placenta.*

IV. *The general relation of Apes to lower forms, and to the Human Female in regard to Menstruation and Pregnancy.*

I. *The general Anatomy of the Specimen so far as it bears on Pregnancy.*

The ape was evidently a young female *Macacus Rhesus*, 18 inches from head to breech. The sagittal mesial section, unfortunately, did not hit the middle line exactly, but by a subsequent cut the pelvis was cut more mesially. The pregnant uterus measured 6 inches vertically, and 4 transversely and antero-posteriorly, was oval in shape, and contained the fœtus and liquor amnii. It was probably near full time. The uterine wall measured only ⅛th of an inch on section, and seemed equally thin throughout. The unimpregnated and pregnant uterus in the human female are each about one-half inch thick.

The Fallopian tubes lay vertically in the abdominal cavity, and the ovary lay behind its corresponding tube. In the left ovary there was a *corpus luteum*.

The more mesial section of the pelvis showed the vagina at right angles to the brim, instead of parallel to it as in the human female: the anal, urethral, and vaginal canals were, indeed, all parallel to one another. The bladder was loosely connected to the pubis, and also to the posterior vaginal wall. The glans of the clitoris was grooved on the vertical mesial line.

The cervical canal was peculiar. It was somewhat dilated, owing to the plug of mucus having become swollen, and was divided into two parts, the lower portion being more dilated than the upper. This is quite different from the cervical canal of the human female, which is a slit-like cavity on section, with its anterior and posterior walls in apposition. This alteration in the cervical canal of the ape may be artificial, but, at any rate, the

cervical canal in this case resembled that of the human female in not being opened up from above down by the advancing pregnancy.

The other points in relation to the fœtus come up afterwards.

II. *The Uterine and Fœtal Casts.*

*Fœtal Cast.*—The fœtus presented the head, although in most cases —Turner's (17), Hunter's (7)—it has at full time presented the breech. The antero-posterior diameter of the head lay in the transverse, and not in an oblique, as it usually does in the human female. The fœtal attitude was quite that of the full-time human fœtus, viz., body with marked dorsal curve and convexity posteriorly; arms flexed at elbow, right arm somewhat across body, left arm less so; hands flexed; thighs flexed on trunk, leg on thigh, toes flexed in, big toe also. The tail was flattened on the right leg, and the head turned a little to the left shoulder. The whole attitude is practically that of the human fœtus in utero at the end of pregnancy, but the condition of the hind paw is, of course, entirely different. In the human fœtus the foot is so placed that the dorsum touches the anterior aspect of the leg, an arrangement quite the opposite to that just given in the fœtal ape's hind paw. The doubled-up fœtus measured 6½ inches extended (without the tail).

*The Uterine Cast.*—This cast was of great interest, as it showed that the uterine wall was moulded on the uterine contents. Thus one can see the fœtal outlines in it; also the groove of the tail. The placental areas of the bilobed placenta are well shown. The lobes lay as usual, dorsal and ventral (in relation to mother). Their measurements were as follows: Dorsal, 3½″ × 2½″; ventral, 3″ × 3″.

Their relations are well seen in the cast.

The cord was attached to the anterior one, and measured 4¾ inches. The vertices and sides of the placentæ were connected by large fœtal vessels,—two arteries and two veins.

It thus seems that the uterine wall is perfectly passive during pregnancy, and is moulded by intra-abdominal pressure on its contents, a condition exactly the same as in human pregnancy.

The behaviour of the uterus during labour is unfortunately not known in apes, but it is to be hoped this gap will soon be filled up.

III. *Structure of the Placenta.*

After the freezing, section-cutting, and casting were terminated, parts of the placenta were cut out for microscopic examination. These were left for twenty-four hours in saturated solution of picric acid, thence removed to 50 per cent. alcohol for twelve hours, and then hardened in stronger alcohols, embedded in paraffin, and cut with the rocking microtome. The sections were fixed to the slide by the water method, and stained with hæmatoxylin and

eosin. Unfortunately, the placenta had suffered somewhat by the preliminary processes to which it had been exposed, and the preparations are not so perfect as might be desired. However, although they do not enable one to speak with certainty of the details of cell-structure in all parts of the preparation, there is no difficulty in making out the histological relationships of the different tissues, and the appearances we find will, we hope, throw some light on obscure points in connexion with this subject.

It is unnecessary to enter into any detailed criticism of the literature bearing upon the placenta of monkeys. This has already been done fully by Turner and Waldeyer, and the only important paper which has appeared since the work of the Berlin Professor is that of Selenka. The points raised by him, and the questions discussed by Waldeyer, can be best approached in describing the individual parts of the placenta. The amnion and the connective tissue of the chorion and chorionic villi have often been described, and in our specimen present no peculiarities calling for remark. Waldeyer has already noted that the villi are more slender than those of the human placenta, and we can quite confirm this observation.

Turner and Waldeyer have also so fully and conclusively proved that the intervillous spaces contain maternal blood, that it is quite unnecessary to discuss that question further. But when Waldeyer says (19, p. 45) that he counts himself among those who accept the view that the intervillous spaces represent dilated capillaries, whose walls are preserved, and instead of being penetrated by the villi are simply invaginated by them, while the villi permanently retain their covering of fœtal epithelium, we join issue with him at once. Apart from the question of the preservation of the capillary walls, which we shall take up immediately, we would ask how it comes, if Waldeyer's view be correct, that this process of dilatation of capillaries has never been observed even in early human pregnancies like those described by Keibel (8) and ourselves (3), or in the still earlier pregnancies of monkeys described by Selenka (13), where there was a considerable thickness of decidua serotina still unconverted into placenta?

We fail to understand how the large numbers of dilated capillaries which are presupposed by this theory unite into the common intervillous space,—a space which extends apparently unbroken except by the villi all through the placenta, or at any rate through large portions of it, and we would point out that we have given reasons for believing that the intervillous space is originally a fœtal space which becomes secondarily only a part of the maternal circulation. That is to say, we have shown that the degenerated decidua serotina is removed by the actively growing epithelium at the tips of the villi, and that the intervillous space behind this attacking line is bounded only by the fœtal epithelium covering the villi, which in the early history

of the placenta is a double layer, later becomes a single cubical layer, and that this single layer is much flattened and degenerated in the full-time placenta. We are therefore among those who believe that the intervillous spaces are extravascular spaces, and that the maternal blood makes its way into them only after the walls of the maternal vessels in the serotina have been destroyed. This view, or something nearly approaching it, is upheld also by Farre, Kölliker, Langhans, and Heinz (*cf.* Waldeyer, 19, p. 44), and we consider that in the degeneration of the serotina, the thrombosis of its vessels and the degeneration of their walls, which we have demonstrated in the early human placenta, we find ample support for our belief. The placenta of the monkey is obviously homologous with that of man, and this homology has been accepted by all writers on

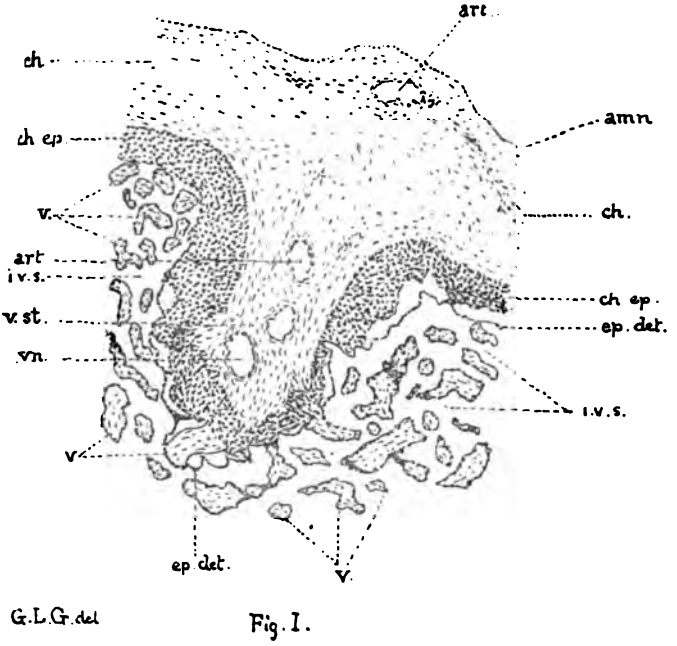



FIG. 1.—Part of the amnion, chorion, and placenta of *Macacus rhesus*:—*am.*, amnion; *ch.*, chorion; *ch. ep.*, fœtal epithelium (ectoderm covering the chorion and main villi); *ep. det.*, the superficial layer of the epithelium detached in places (Waldeyer's endothelium); *v.*, villus; *v. st.*, villous stem; *art.*, artery; *vn.*, vein; *i.v.s.*, intervillous space containing maternal blood. Ob. ⅙, oc. 4.

the subject, so that we feel justified in taking it for granted that in this matter also the correspondence is complete. That this destruction of vessels by placental growth can happen is proved abundantly by every extra-uterine gestation, as there maternal blood is invariably extravasated round the villi.

Waldeyer's main reason for regarding the intervillous space

as representing dilated maternal vessels seems to be that he finds, in the placenta of *Inuus Nemestrinus*, a single layer of cells, which everywhere borders the intervillous space, being continuous with the endothelium of the arteries and veins which open into that space, covering the so-called "decidual hillocks," in which the "Haftzotten" or attaching villi are embedded, and covering the villi and the under surface of the chorion. He says that this layer is easily detached from the subjacent tissues, and regards this as a sign that it is endothelium. We see this layer perfectly in the placenta of *Macacus Rhesus*—much better than in any human placenta—and note also how easily it is detached; but we consider that it is the outer layer of the fœtal ectoderm, and we shall describe it as such in due course. We would point out, however, that the ease with which it is detached is, to our minds, a proof rather of its epidermal than of its endothelial nature: nothing is more difficult than to separate a true endothelium from subjacent tissue. The cells have a character totally different from any endothelium; they are cubical, closely set together, and with a considerable cell body, and we know of no instance elsewhere where an endothelium enclosing enormous masses of blood is opposed over a vast area to epithelium, and especially epithelium belonging to another individual, without any trace of connective tissue to support it. Moreover, we know of no force involved in the formation of the placenta which could act so as to dilate capillaries in this imaginary way, nor any reason, logical or histological, why, if all the other tissue-elements of the decidua are removed, by the villi or otherwise, the vascular endothelium should be spared entire, and moulded to the surface of the destroying villi.

In the discussion of the relations subsisting in the placenta, too little attention has been paid by many authors to the fact that the tissues of two separate individuals are involved in its formation, and it has been taken too much for granted that the uterus had an important part to play in the formation of that organ. Turner, however, calls attention to the distinct nature of the fœtal and maternal parts of the placenta, and speaks of the fœtus as a parasite. Selenka also regards the embryo as the parasite of the uterus, and in truth all our observations tend to show that the part played by the maternal tissues is mainly a passive one, and that the fœtus profits by the degenerative processes which go on in them. Even the formation of the decidua reflexa seems to be really an accident, so to speak, connected with menstruation, and not a true formative process; the fertilised ovum, implanted on the surface bared by the menstrual flow, is covered over by the rapid growth of the uterine mucous membrane, and so is "healed in" as any other non-irritating foreign body would be. When the ovum begins to increase rapidly in size, and to invade and press upon the decidua reflexa,

that envelope degenerates in precisely the same way as the serotina, but even more rapidly.

The covering of the chorion and villi is entirely fœtal, therefore, in our opinion, and, just as in the human placenta, it differs in different places. One point in dispute between different authors is whether the main or amniotic chorion is covered by a single layer of cells, or by a layer of several cells. Turner, in Macacus, found a layer of several cells; Waldeyer, in Inuus, found a single layer. Very possibly, as Waldeyer suggests, the placentæ

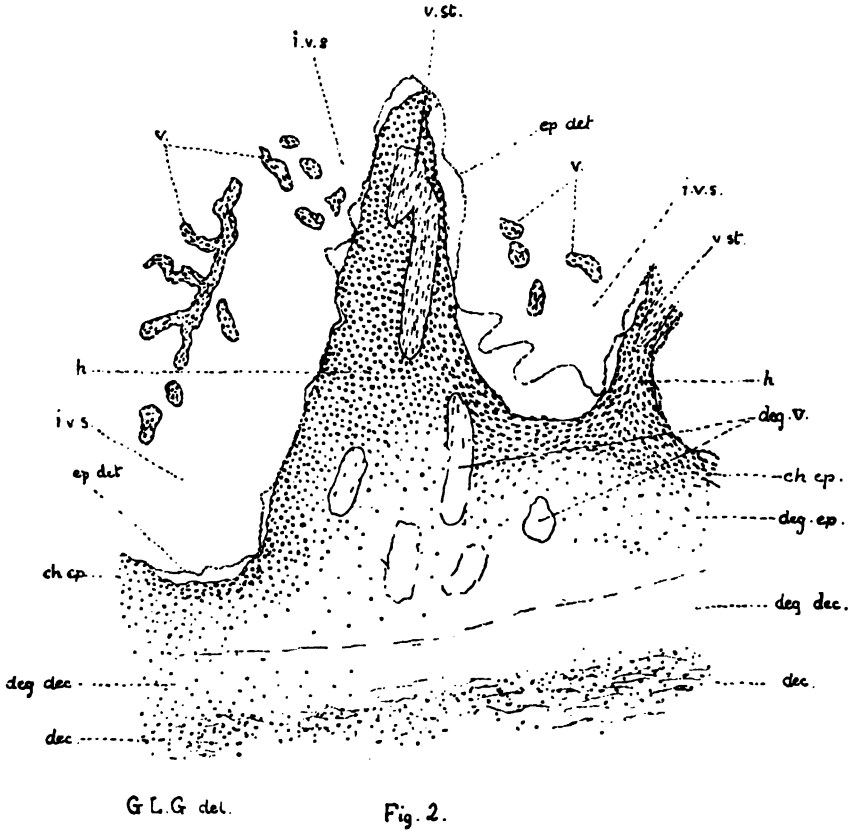



FIG. 2.—Section through the same placenta to illustrate the attachment to the decidua serotina:—*deg. v.*, degenerated villi; *deg. ep.*, degenerated fœtal epithelium on the surface of the trophoblast; *dec.*, decidua; *deg. dec.*, degenerated decidua; *h.*, so-called "decidual hillock"—trophoblastic expansion of the fœtal ectoderm at the extremities of the main villi. Other letters as in Fig. 1.

may have been of different ages, or different parts may have been examined. We certainly find everywhere a many-celled layer, but differ entirely from Turner and Waldeyer in our interpretation of it. These authors seem uncertain whether to

regard it as decidual, and representing Winkler's "Schlussplatte," or as chorionic, and derived from connective tissue cells. We see every reason to regard it as fœtal and ectodermal. It coats the main chorion and the main villi, running along these to become continuous with the so-called "decidual hillocks" into which the main villi or "Haftzotten" run. These hillocks we regard as expansions of the fœtal ectoderm of the same nature as those we have described in the human placenta (3), but which seem to be preserved to a later date, relatively, than in man. The cells of this layer are obviously different in character from the true decidual cells. Next the chorion is a layer of fairly columnar cells; then they are disposed more irregularly, and towards the surface—the intervillous space—are somewhat flattened, while the superficial layer, that which Waldeyer regards as an endothelium, is a layer of flat cubical cells, which, when the villi are cut so that a surface view of them is obtained, are almost exactly like the layer of epithelial cells covering the amnion. Nowhere in the whole of this layer, either on the chorion or villi or in the so-called "hillocks," are there any bloodvessels, leucocytes, or fibres, all of which are invariably present in any modification of the uterine mucous membrane, and the cells (and nuclei) are all very nearly of the same size,—a characteristic of epithelium rather than of connective tissue.

Perhaps the most conclusive proof of the fœtal and epithelial nature of this tissue is the fact that a layer presenting exactly the same characters, but with a thickness of two or three cells instead of six or a dozen, covers the surface of the chorion outside the placenta altogether, and is separated by a layer of degenerated fibrinous-looking material from the remains of the decidua vera, which are quite unlike it in appearance.

Where the main villi break up into branches, this thick layer thins out, gradually or abruptly, and the small villi are covered simply by the single superficial layer, which has the same characters here as over the "hillocks" and elsewhere, and these small villi have much the same appearance, therefore, as the villi in a human placenta of about seven months, when the epithelium of the villi has become reduced to a single layer, and has begun to degenerate.

The so-called "decidual hillocks" require a word or two of description. They are to be found at the points where the main villi come in contact with the serotina, and the old idea in regard to them was that they were masses of decidual cells,—*i.e.*, connective tissue cells, which in some unexplained way formed or were found at these points. Whether the villi tended to attach themselves specially to pre-existing hillocks, or whether they produced these masses of decidual cells by some action of their own, no one seems to have inquired, though the first supposition seems unlikely and the second well-nigh impossible, as the hillocks are based upon degenerated serotinal tissue.

What we see in these structures is, that the layer of fœtal ectoderm, which underlies the main chorion and runs along the main villi, becomes thick and massive at the points where the main villi approach the serotina, and the mass of cells forms a cone into whose apex the villous-stem is inserted, and whose base is spread out upon the surface of the serotina. The bases of the cones usually extend somewhat over the surface of the serotina, much more than the corresponding structures in the human placenta do, except in the very beginning of its history, and the base of one cone thus generally meets or nearly meets the base of another, as a flattened layer, unless the opening of an artery or vein into the intervillous space breaks the continuity. The layer of flattened epithelium (Waldeyer's endothelium) passes from the villous-stem over the surface of the cone which is turned towards the intervillous space, and runs over the flattened layer between the cones. This fact, as Waldeyer himself half acknowledges, is an important point against his theory, for if this layer really represented the endothelium of dilated vessels, which are invaginated before the growing villi, why is this layer not invaginated before the main villi? Waldeyer regards it as a proof of the correctness of his view as to this layer, that it is continuous with the endothelium of the arteries and veins opening into the intervillous space, but as this layer bounds the whole of the intervillous space, it could hardly but be continuous with the endothelium; that continuity cannot imply identity when the two layers are so totally unlike one another. The connective tissue core of the villus leaves the layer behind it at the apex of the cone, and branches and rebranches within the cone without any other covering than the cells of the cone itself. These cells have the epithelial characteristics already mentioned, and we see every reason to regard them as homologous with the masses of fœtal epithelium cells at the tips of the villi which we have described in the human placenta. In the monkey this structure evidently persists to a later period than in man—for what reason we do not venture to surmise. The deep or serotinal surface of these epithelial cones is generally slightly degenerated, especially if the mass of cells in the cone is large, not so much in the flatter expansions, and the tips of the connective tissue branches of the villi, which are usually flush with the serotinal surface of the cones, are always markedly degenerated, the nuclei are lost, the fibrillated character of the connective tissue disappears, and the villus is only recognisable by its difference from the surrounding structures in the matter of staining. This tendency to degeneration of the surface of the epithelial part of these cones we have noted also, though to a much less extent, in the human placenta, and it is, of course, a common phenomenon in all many-layered epithelia, especially when exposed to pressure.

It is exceedingly to be regretted that the histological part of Selenka's memoir on the ape's placenta (13) has as yet only the character of a preliminary notice, and that he has not at all discussed the minute structure of the advanced placenta; for his figures show us that between the early stages of the monkey's placenta and that of man there is the most startling similarity. This is especially to be noted in the great development in the monkey of the "trophoblastic" epithelium at the tips of the villi (*cf.* Taf. 35, Figs. 5, 11, 12; Taf. 37, Fig. 5). Selenka has indeed entirely missed the significance of this structure, and regards it as a development of the maternal epithelium, because he regards the outer layer of the epithelial covering of the villi as maternal. In this view he stands at the present day almost entirely alone, and his own figures might have shown him his error. As Waldeyer points out, the characters of the two epithelia are totally different. Selenka lays great stress upon the fact that in one specimen the epithelium at the end of a villus was found entering a large dilated gland; but in the figure which he gives of this, none of the twenty or thirty other villi which reach the serotina enter glands at all, but are all coated with "trophoblastic" epithelium, which is apparently destroying the serotina. His Fig. 12, Taf. 35, might have been drawn from some of our preparations of the early human placenta. The view that maternal epithelium enters into the covering of the villi has been abundantly discussed by Minot (12) and ourselves, and need not be further entered into.

The decidua serotina is robbed by us of its "placental layer" (Waldeyer and Turner), which consists of the hillocks. The superficial part of the serotina we find markedly degenerated, sometimes forming simply a fibrinous mass, just as in the human placenta, and the extremities of the mesoblastic core of the villi, themselves degenerated, sometimes penetrate this layer. Below this layer is a true decidua, not very different from the human serotina, except that the cells are never so large. There are many vessels in this layer, whose walls are often considerably degenerated, and beneath it there is a spongy layer, not well developed, but having the same characters as that in the human placenta. Waldeyer doubts the presence of this layer, but here again a difference in the age of the placentæ examined may explain the discrepancy.

The decidua vera external to the placenta is very like the serotina, but very much thinner and less vascular.

IV. *The general relations of Apes to Lower Mammals, and to the Human Female in relation to Menstruation, the Determination of the Placental Site, and the Origin of the Umbilical Cord.*

Under this head we wish to consider some special points of great interest. These are:—

(*a.*) *Menstruation in Apes.*
(*b.*) *The Determination of the Placental Site.*
(*c.*) *The Origin of the Umbilical Cord.*

(*a.*) *Menstruation in Apes.*—In the higher apes it is now well know that a periodical discharge of blood takes place from the genitals. The best research is by Bland Sutton (14), who examined the uteri of several macaques and baboons, at various stages. As the animals were killed and the parts at once preserved, no fallacy of post-mortem changes came into the observations. Sutton found that the mucous membrane became thickened, that blood escaped (small in quantity), and that there was no shedding of the superficial layer of the mucous membrane, *the epithelium remaining intact, although blood was found in the uterine cavity.*

In the human female, however, as is now well known (Kundrat (10), Engelmann (2), Leopold (11)), the superficial layer of the uterine mucous membrane is shed, and thus we have a distinct difference between menstruation in apes and the human female. Whether or not in the very highest apes, such as the gorilla and chimpanzee, denudation of the mucous membrane occurs is as yet unknown.

(*b.*) *The Determination of the Placental Site.*—The comparative physiology of this point is one of the greatest interest and value. In *Ruminants*, as is well known, there are special elevated and thickened parts of the mucous membrane, the cotyledons, on which the villi graft and give the well-known polycotyledonary placenta. We have, therefore, specially developed areas for placental attachment.

In *rabbits*, the ovum always grafts itself on two folds, the placental folds, which run parallel, and on the side of the broad ligament attachment.

In the *hedgehog*, according to Hubrecht (6), the ovum attaches itself, and the placenta develops in that part of the uterine horn opposite the broad ligament attachment, the mucous membrane being thinnest at the side next the broad ligament in the virgin uterus.

In the *apes* examined by Selenka, it was found that there was a special part of the middle of the posterior uterine wall—the "Haftfleck"—where the dorsal lobe of the bilobed placenta developed; the ventral lobe developing on a corresponding portion of the ventral uterine surface a little later. This "Haftfleck" had about thirty or forty gland openings in it, and increase of the placental site was due to an increase in the "Haftfleck."

It is of remarkable interest that in the apes with bilobed placenta, where the uterus is formed on the same plan as in the human female,—*i.e.*, has Fallopian tubes and a single uterus,—

pregnancy is made uterine by this arrangement of a "Haftfleck" for the placental site, and that in all apes with a bilobed placenta the placenta is in invariably the same position—the middle portions of the anterior and posterior uterine walls.

In those apes with a single placenta we have no special observations: in the human female the placenta may graft itself normally on any part of the uterine surface proper,—*i.e.*, never below the os internum nor outside the inner openings of the Fallopian tubes. If we take the bicornuous uterus as displayed in a ruminant, we find a narrow tube, then the cornua. The implantation of the placenta in the cornua is favoured by the cotyledonary arrangement, and no tubal pregnancy has ever been found.

In the human female we have already thrown out the suggestion that the human ovum can only graft on connective tissue, and that menstruation thus bares a safe area. It must be remembered that the Fallopian tube of the human female has a very perfect mucous membrane, and one that can form a serotina like the uterine mucous membrane itself, and it is possible that the menstrual denudation maps out a normal attachment-area in the human uterus.

(*c.*) *The Origin of the Umbilical Cord.*—The origin of the cord is at present disputed. The view usually adopted is that of Kölliker (9), viz., that at one period the developing ovum is free, but is again moored to the chorion by the outgrowth of the allantois.

His (5), on the other hand, maintains that at an early stage the developing ovum is in connexion with the chorion by its posterior end—"Bauchstiel"; that this forms the cord—the allantois tunnelling it, as it were. The covering of the cord is therefore morphologically skin, and not amnion. At first the cord is covered with a single layer of cells; at about the third month this layer is multiple, and at the full time many-layered and flattened. Thus the covering of the cord is morphologically skin, but not so completely differentiated as over the fœtus.

Hertwig (4), on the other hand, holds that the developing ovum is attached to the chorion at first by amnion. The closure of the amnion is at the posterior end of the embryo. The allantois grows out, not free into the cœlom, but along the ventral surface of the amniotic attachment.

Selenka (13) describes this last condition as occurring in the monkey. The question, however, cannot be considered settled as yet.

We have only a few words now on the relation of this class of apes to the scale of evolution. We regard the main branches of the mammalia as having diverged from the primitive monotremes and marsupials. Thus we have monotremes, marsupials,

and then the primates, comprising lemurs, apes, and man. We have here a gradation. The ornithorhynchus has a completely bifid genital tract and lays eggs; the marsupials have a less bifid uterus, and a very imperfect villous attachment of the fœtus to the maternal structures.

The lemurs have a bicornuous uterus and diffuse placenta; the lower apes a single uterus, bilobed placenta, and no reflexa; the higher apes and human female, a single uterus, single placenta and reflexa. Looked at from the special point of view of attachment of the placenta, we get—

(*a.*) No attachment of fœtal tissue: ornithorhynchus.

(*b.*) Very imperfect attachment: kangaroo.

(*c.*) More perfect attachment, but placenta non-deciduate: lemurs.

(*d.*) Placenta deciduate, but not embedded: lower apes.

(*e.*) Placenta with reflexa,—*i.e.*, ovum embedded at first in maternal tissues, placenta deciduate: higher apes and human female.

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### EXPLANATION OF PLATE.

A. Sagittal section through pregnant monkey (frozen), a little to the right of the middle line (about ⅓ of the natural size).

B. Part of an exactly mesial section through the pelvis, to show the central dilatation of the cervix, the fact that it is not opened up from above down, and that the urethra, vagina, and rectum are all parallel and vertical.

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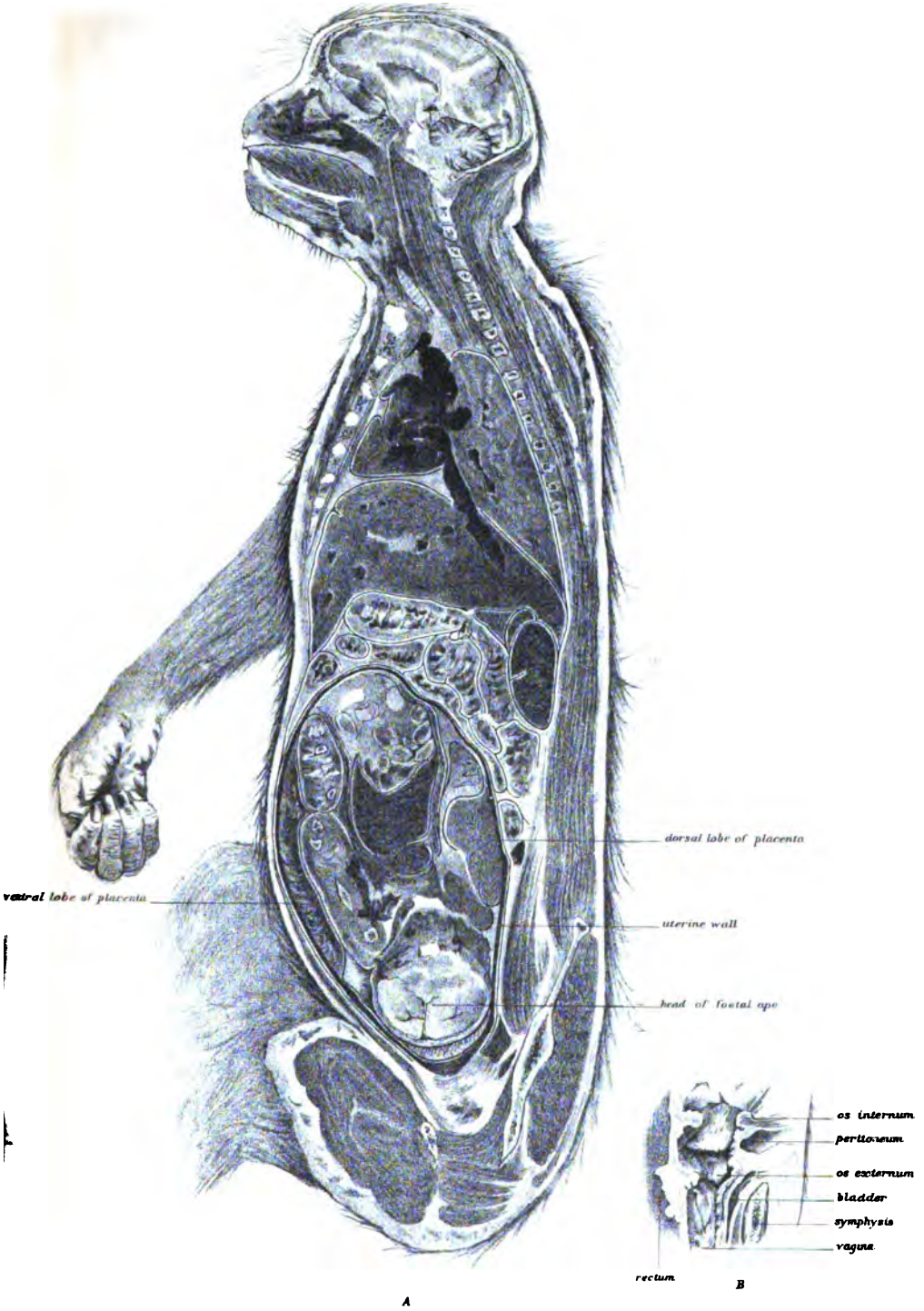
*Dr J. W. Ballantyne* wished to learn from Dr Gulland whether his researches on the placenta had thrown any light upon the problem of the transmission of certain diseases from mother to fœtus in utero. Experiments upon the passage of bacilli through the placenta had given very contradictory results, and he thought that in all probability the conflicting evidence was due to the different condition of the placenta in the various experiments, the presence in it of blood extravasations, etc.

*Dr Gulland* agreed with Dr Ballantyne that these experiments had not led to any definite result, and thought that, besides the factors in the uncertainty which had been mentioned, different forms of bacilli might probably pass through the placenta with different degrees of facility.

## VIII. INDUCTION OF LABOUR BY MEANS OF INTRA-UTERINE INJECTIONS OF GLYCERINE IN A CASE OF ECLAMPSIA GRAVIDARUM.

By ALEXANDER RUSSELL SIMPSON, M.D., President of the Royal College of Physicians, Professor of Midwifery in the University of Edinburgh, and President of the Edinburgh Obstetrical Society.

ON the 12th of November last I was called by Dr Sloan to see a case of puerperal eclampsia which presented various features of special interest. The patient was brought into the Maternity, and




GRAVID UTERUS, MACACUS.

I record the history as it has been drawn up by one of the house-surgeons, Dr E. C. Easterbrook, who, with the aid of his colleague Dr W. Petrie Simpson, carefully watched the patient and made notes of her progress.

Mrs H., i-para, aged 26 years, a married woman living in Albert Street, Leith Walk, and attended by Dr A. T. Sloan, was admitted into the Edinburgh Royal Maternity Hospital on Saturday, the 12th November 1892, at 10 A.M., being in a condition of incipient labour, complicated with coma and convulsions.

HISTORY:—1. *Social.*—Patient is a married woman, with a comfortable and apparently healthy home and surroundings.

2. *Family.*—Her parents were healthy—father dying at 69, and mother being still alive. Some of her brothers and sisters died of phthisis. One paternal aunt was insane, and another paternal aunt was hysterical; both are now dead. Husband says he is a healthy man.

3. *Personal.*—Patient is a moderate eater, practically a teetotaller; has always been of a rather nervous and excitable nature, and of late has been somewhat put about by the sayings of her neighbours as to what she would have to go through in her approaching confinement. She had measles and scarlatina in childhood; occasionally she complained of a swollen and painful left leg, and of a sore throat at winter times. She occasionally also had eruptions of "brown scaly spots," both before and after her marriage (in August 1891). Patient has always had a tendency to constipation. Menstruation began at 15 years, being of 28-day type, lasting five days, and being of moderate quantity.

*Pregnancy.*—Date of probable conception, in first week of April 1892. Date of last menstruation, from 4th to 9th April 1892. Date of first stirrage, in June 1892.

Pregnancy, then, commenced in April 1892; during it we may note the following:—Morning sickness, which occasionally amounted to a vomiting of breakfast, ceased at sixth week. Constipation was marked throughout pregnancy, patient sometimes going a week without motion. There were the usual errors of micturition, but urine was always in usual quantity. Stirrage (which is affirmed to have been perceptible to mother by third month) was always very distinct, often preventing her from sleeping at night, and even from sitting about quietly during the day, and sometimes causing her to complain of it to her husband. At the end of October the fœtal movements gradually diminished, and in about a week (*i.e.*, a week before admission on 12th November 1892) had ceased altogether; and during the same time there occurred a "sinking down of the womb" and a discharge from the genital passages. After the end of October the following complications also arose:—Great thirst, continuous headache, which never really left the patient, and was occasionally severe.

After the thirst and headache had been present for a week, came a sudden but short attack of vomiting (at 9 A.M., on 8th November 1892); about two days later, while patient was in bed (at 1 A.M., on 10th November 1892) occurred a severe attack of shivering. Nothing unusual, according to husband, was noticed in connexion with the sight, hearing, memory, or urine, although slight twitchings of face sometimes occurred during the previous day or so. Next day (11th November 1892) patient had her first free motion for a week; but the headache had meanwhile become very intense, being now distinctly frontal and right-lateral, and while the patient and her husband were sitting at tea (at 5 P.M., on 11th November 1892) ended in her first fit, during which patient showed "whites" of eyes, became convulsed in face and limbs, and seemed semi-conscious. Dr Sloan was sent for, and arrived to find patient rational and conscious, with temperature and pulse normal and urine non-albuminous. He ordered attention to bowels, and rest, and prescribed potassium bromide. During the night and early morning the patient had ten more "fits" (second at 7·10 P.M., third at 8 P.M., fourth at 8·50 P.M., fifth at 9·30 P.M., sixth at 10 P.M., seventh at 11 P.M., eighth at midnight, ninth at 1 A.M., tenth at 3 A.M., eleventh at 4 A.M.), and became gradually comatose, with equally-contracted pupils and somewhat spasmodic rigidity of right lower limb. Sedative and purgative enemata and hypodermic morphine injections were given during this time, their administration being noticed to be usually followed shortly by another fit. From the time of the eleventh fit at 4 A.M. on 12th November 1892 the patient was kept under the partial influence of chloroform, which seemed to prevent the recurrence of fits.

Dr Sloan now recommended a consultation with Prof. Simpson, who arrived about 8 A.M. on 12th November 1892, and advised the induction of premature labour, and so at 8·15 A.M. he injected up along the undilated os and canal of cervix into lower uterine segment about 3 oz. of glycerine. Dr Simpson also recommended that patient should come to Maternity Hospital, where she was admitted at 10 A.M.

*Physical Examination on Admission.*—Patient was admitted as a case of eclampsia, and so was douched vaginally previous to examination with 1–30 boracic lotion, instead of the usual 1–2000 corrosive lotion. Patient is medium sized, well formed, and well nourished, in a helpless prostrate attitude, and unconscious. Twitchings frequently pass over the face and limbs. Pupils are equally contracted, and do not react to light or accommodation. Temperature 97°·8 F.; pulse 60, and breathing 12 per minute.,

*Urine* (℥xvj. of which were drawn off from the bladder by catheter just after admission, and examined at once).—Sp. gr. 1020, acid reaction; urea, 10 gr. per oz.; urates very abundant, depositing freely when urine cooled; sugar reactions slightly pre-

sent (probably due to glycerine excreted). No albumen, blood, or tube-casts.

Examination of thorax showed heart and lungs to be apparently normal. Mammæ primiparous, but do not show very markedly the changes in pregnancy, there being but slight enlargement, no striæ, and no milk expressible.

Examination of abdomen and pelvis gave evidence of a uterine tumour, not very prominent, ovoid, reaching to midway between the umbilicus and episternum, fairly central, cystic, now and again contracting, and containing a fœtus with its back to left and front, and its head apparently within pelvis. A bruit synchronous with maternal pulse is heard along right border of uterus, but no heart-sounds are audible.

Presentation, vertex. Position, L.O.A. Soft passages favourable, os uteri being now dilated to size of a shilling piece. Pelvic measurements normal.

*Labour.*—Labour had evidently been successfully induced by the intra-uterine injection of glycerine at 8.15 A.M., and at time of admission, 10 A.M. (*i.e.*, 1¾ hours after the injection), the os had reached the size of a shilling, as just stated. At 10.20 A.M. came the twelfth fit, and at 2.30 P.M. occurred the thirteenth fit, which was specially severe, similar to the others. During it the eyes were strongly deviated to the left, lips and nose were much contracted and performed various movements; lower jaw was clenched, and the upper and lower limbs passed into a state of brief tonic spasm, followed by a state of short clonic spasms which made the bed shake. (Temperature was 98° F., pulse 110.)

At 11 A.M. (when os uteri was still the size of a shilling piece) the second application of glycerine was made, in the shape of two glycerine plugs (*i.e.*, cotton wool soaked in glycerine), one of which was carried up cervical canal, the other being left in fornix vaginæ. At 1.40 P.M. the plug was removed from fornix, the os being still size of a shilling. At 4.20 P.M. the os was size of a florin, and ʒvj. of glycerine were injected into uterus, this being the third application of glycerine. At 6.30 the os was almost wholly dilated, the first stage ending at 6.45 P.M., and therefore having lasted 10½ hours. During this stage, in addition to the two fits (at 10.20 A.M. and 2.30 P.M.), the patient vomited twice (at 11.30 A.M. and 2.25 P.M.), and had one very small motion (at 2.40 P.M.), although there had been administered olei croton. ♏iij. to back of tongue (at 10.40 A.M.), a glycerine suppository (at 1.30 P.M.), and an ordinary soap and oil enema (at 2.10 P.M.) ℥v. urine were drawn off from the bladder at 4.40 P.M.

The second stage lasted less than half an hour, the child being expelled at 7.12 P.M., with the cord twisted twice around its neck. Child had been dead several days. During the second stage patient was kept somewhat more deeply under chloroform than during the first stage, in order to prevent supervention of more

fits. No fits occurred, and expulsion was effected almost entirely by the uterus.

The third stage came to an end at 7.30 P.M. on 12th November 1892, lasting eighteen minutes.

*Puerperium.*—The puerperium lasted only 34½ hours, the patient dying at 6 A.M. on Monday morning, the 14th November 1892. Pulse and temperature were taken every hour, and their variations are shown in a Chart. (Chart shown.)

*Temperature* was very irregular, though varying within small limits (97°·2 to 100°·2 F.).

*Pulse* was also very irregular, both in frequency (varying from 62 to 116) and in rhythm; ultimately, also, it became very soft.

*Breathing* was fairly normal during first twenty-four hours of puerperium, but on Sunday evening it became very irregular in frequency (sometimes slow, oftener rapid), in rhythm, and in depth, and before midnight resembled the Cheyne-Stokes ascending and descending type.

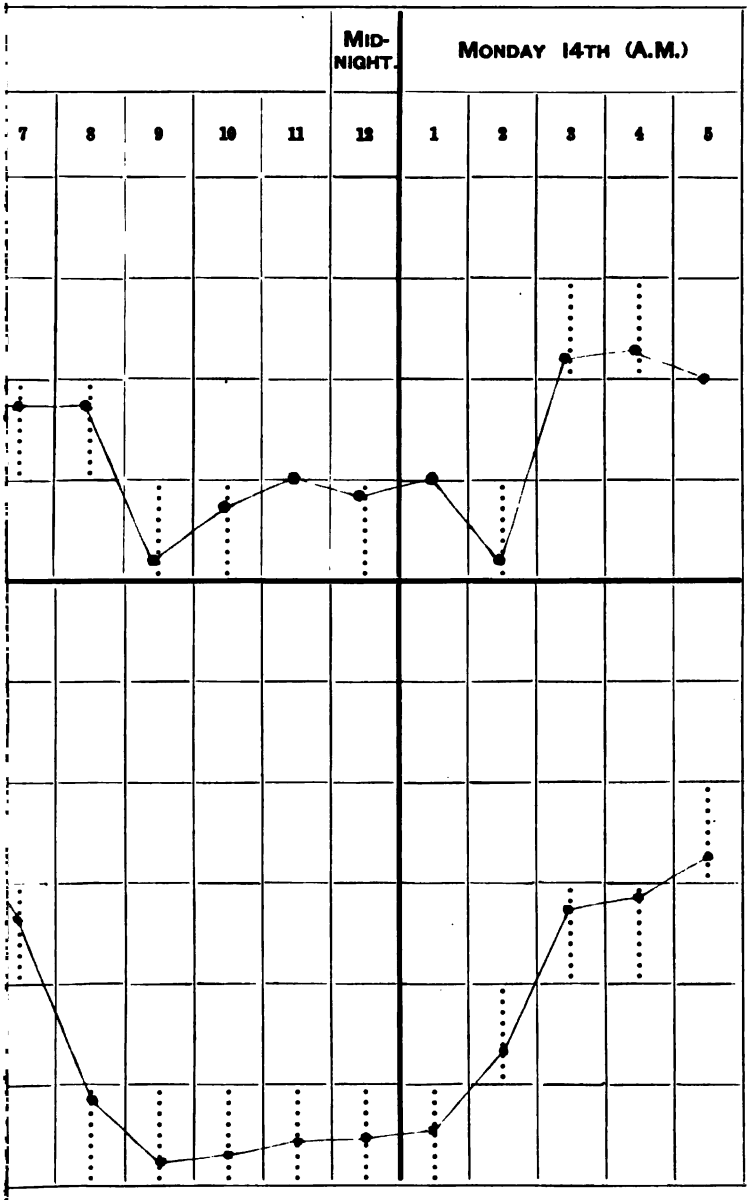
*Motions.*—Patient had her first and only free motion at noon on Sunday, but only after having previously swallowed ℥iss. of Henry's solution and a little milk containing ♏iij. of croton oil.

*Urine.*—On Saturday, the day of labour, 30½ oz. were taken from bladder. On Sunday 25½ oz. were taken from bladder, and in addition some was passed in bed towards midnight. Albumen appeared only in urine at very end, and in small quantity.

*General Condition (Fits, etc.) and Termination.*—On the evening after delivery patient had her fourteenth (at 10.50 P.M.) and fifteenth (at 11.15 P.M.) fits. Early next morning she seemed to improve, and, though still unconscious, was able for first time to swallow. Her last fit (sixteenth) occurred at 10.10 A.M. (Sunday). Towards the afternoon she became more conscious than she had yet been, and seemed to recognise her husband. On Sunday evening, however, she changed for the worse, becoming quite unconscious, restless, with irregular temperature, pulse, and breathing, clonic convulsions of face and upper limbs, and a more tonic rigidity of right lower limb. Right pupil became dilated to ⅜ths of an inch at 8.30 P.M. Left pupil became like its fellow at 4 A.M. on Monday morning, and patient died at 6 A.M.

*Further Reports* on—(1), Urine; (2), Mother (post-mortem examination); (3), Infant (post-mortem examination); (4), Secundines.

(1.) *Urine.*—Specimens of patient's vomit, fæces, and urine (viz., a specimen of each of the three mornings' urine) were sent to Laboratory of Royal College of Physicians. The urine was considered the most important to examine, and the report upon it only confirmed the analysis made in hospital. Albumen occurred only in specimen of urine taken after death, and, according to Dr Noël Paton and Dr Boyd, this urine contained ·23 per cent. total pro-


MID-NIGHT.
MONDAY 14TH (A.M.)
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teids, consisting mainly of serum albumin, but slightly of serum globulin.

(2.) *Mother.*—Dr Robert Muir performed a sectio about nine hours after death.

*Extract from Dr Muir's Report.*

*Naked-eye and microscopic appearances:*—Heart normal; left ventricle contracted; fluid blood in cavities (no clots). Spleen normal. Lungs both somewhat congested; apices (especially left) are seat of groups of old tubercles, some fibrous, some calcareous. Liver pale yellow in colour, lobules being yellow at periphery, and sometimes dark at centre; granular gritty areas here and there; microscope revealed condition of slight cloudy swelling and more marked fatty infiltration. Left ovary showed corpus luteum of pregnancy; left ovarian vein was greatly dilated, and contained a recent clot. Kidneys normal size; capsule non-adherent; surface smooth and pale, with lines of congestion; cortex decreased; parenchyma increased; interlobular straight vessels congested. *Micro.*—Cloudy swelling, passing on to acute nephritis; no casts in collecting tubules, or any evidence of old kidney disease; epithelium of convoluted tubules swollen and granular, and in places disintegrating capillaries between tubules compressed by them; larger vessels and capillaries in other parts markedly congested. Brain: Convolutions somewhat flattened; extensive hæmorrhage had torn up the anterior portions of both frontal lobes, especially the right one, which was almost wholly destroyed; there was a diffuse subarachnoid hæmorrhage over parietal lobes; the posterior end of mid-frontal convolution on left side contained an older more limited hæmorrhage; there was a clot in the fourth ventricle. *Micro.*—Arteries of brain normal (no syphilis); superficial veins of brain in pia-arachnoid were greatly distended with dark blood, which had formed fairly firm clots in many of them. "From condition of vessels and distribution of the hæmorrhage, I have little doubt that the bleeding had taken place from the superficial veins on both sides. I think it quite possible that this may have occurred during the convulsions."

(3.) *Infant.*—(Male, 18½ inches, 5 lbs., about 8 months old). Had been dead several days before birth, the cuticle being peeled from penis and scrotum, and a reddish-blue discoloration, occupying abdomen, scalp, face, and neck, on which were visible outlines of two coils of cord. An examination of the organs showed no evidence of syphilis or of any other cause of death.

(4.) *Secundines.*—Liquor amnii apparently normal. Membranes apparently normal. Cord, 24 in.; torsion moderate; two coils round neck; discoloured. Placenta ovoid in form, small, 13 oz.; presented a large, round, opaque white mass, hard to touch, and separated from general placental mass by thin tissue. The

placenta was sent to Laboratory of Royal College of Physicians, Edinburgh, to be examined by Dr J. C. Webster, who reports as follows:—

"The placenta showed white nodules in a few places, occupying the whole thickness of the organ. Otherwise the placenta is healthy. On microscopic section these nodules are found to consist of villi and villous stems massed together, and surrounded with fibrin. The epithelium covering the villi is in places destroyed. The mucoid tissue in the stems and villi is entirely changed to dense fibrous tissue. The vessels show proliferation of the endothelium, in some cases so marked that the lumen is entirely closed."

The case may suggest various questions for discussion. As regards the cause of eclampsia, for example, which the pathology of the day leads us to look for in a toxæmia due to impairment of the kidneys, the absence of albuminuria until the last hours of the patient's life, and the fact that the nephritis observed at the post-mortem was evidently of quite recent origin, seem to indicate that in this instance the eclamptic seizures had preceded, and not been due to the renal changes. That the fœtus had been dead some time before the fits occurred seems to be a further reason for seeking the cause of the seizures in some other direction. If still we are to think of blood-poisoning, we must keep in view the bad history which is given of the alvine evacuations. Habitually constipated, the patient had gone a whole week without motion of the bowels just before the fits came on, so that, instead of a uræmic origin, they may here have been due to some kind of stercoræmia. Further, though there had been no perceptible icterus, the post-mortem examination showed that the liver was diseased, so that the mischief may have been cholæmic; and in this connexion I note that in Duhrssen's[1] record of 200 cases of puerperal eclampsia, 16 of the 37 fatal cases had icterus, or showed traces of hepatic disease at the autopsy.

Again, the death was due to the extensive cerebral apoplexy. The proportion of cases of eclampsia in which this complication arises is variously given by different authorities. Thus, while Löhlein[2] speaks of only two deaths from cerebral apoplexy in 352 cases, Goldberg[3] has four brain extravasations in his 81 cases; and Olshausen[4] finds in his 200 cases five where the cerebral apoplexies had proved fatal, two others with considerable hæmatomata of the pia mater, and five more in which there was decided hyperæmia of the brain, and usually also of its membranes.

[1] "Ueber Eklampsie" in *Archiv für Gynäkologie*, xliii., 49, 1892.

[2] *Gynækologische Tagesfragen*, Heft ii., 81, 1891.

[3] "Beitrag zur Eklampsie auf Grund von 81 Fällen" in *Archiv für Gynäkologie*, xlii., 85, 1892.

[4] "Ueber Eklampsie," Volkmann's *Sammlung Klinischer Vorträge*, January 1892.

But the point that is of most practical interest in the history I have recorded is the method adopted to promote uterine activity, and to those who have not read Pelzer's paper[1] on "Erwegen der Wehenthätigkeit durch intra-uterine Injection von Glycerin," I suppose it will have the interest of novelty. In this paper, after indicating the dangers and uncertainties attendant on the methods so commonly employed for inducing labour of injecting warm water, or of introducing an elastic bougie between the membranes and the walls of the uterus, he gives the history of four cases in which labour was induced by injecting glycerine into the lower uterine segment. In the first case the membranes were accidentally ruptured by the point of the syringe; but in the other three cases the injection was successfully carried out. Two of these were cases of induction of premature labour for contracted pelvis; the other was a case of placenta prævia.

To the inquiry as to how the glycerine injection sets up uterine action, Pelzer offers three suggestions,—

1. It produces a mechanical separation of the membranes from the interior of the uterus. This is an action which it has, of course, in common with other methods employed for the purpose, such as the separation of the membranes with a finger, sound, or bougie, or by the injection of warm water, pure or medicated, through the cervical canal.

2. He suggests that it may have the effect of a direct irritant on the interior of the uterus, setting up in this way uterine contractions. This is the more to be believed when we remember the effect of injections of glycerine into the rectum, which favour the evacuation of that canal, not merely by the promotion of secretion, but by irritation set up in the muscular wall, the contractions in which sometimes continue in a tenesmic fashion after defæcation has been completed.

3. The most important influence of the glycerine, however, lies in its well-marked hygrometric property. Its power of absorbing water is so pronounced that it attracts to itself the liquor amnii through the medium of the membranes, and there results from this withdrawal of the liquor a certain degree of collapse of the uterus, such as is seen in cases where the membranes are ruptured and the fore-waters escape. Pelzer cites in proof of this power which glycerine possesses of abstracting liquor amnii through the membranes the observation that may be made of placing an aborted ovum in glycerine, when the walls of the sac will be seen gradually to collapse as the liquor passes through them, until it becomes almost completely absorbed by the glycerine. He has made the experiment, further, of dipping into coloured water a tube containing glycerine, and having the mouth closed with a piece of the membranes, when he found that the glycerine becomes coloured

[1] *Archiv für Gynäkologie*, xlii., 220.

and quickly increased in volume, while the quantity of water diminishes. On the other hand, when he dipped a similarly closed tube containing clear water into coloured glycerine, the water remained clear, but quickly lessened in quantity,—all showing that the liquid was powerfully absorbed by the glycerine.

Pelzer tells us, moreover, that he was the rather disposed to make use of this means of inducing premature labour because of the consideration that glycerine possesses distinct antiseptic qualities, and that it was likely to exert a beneficial action as an emollient in promoting the relaxation of the soft canals. A substance having such valuable properties as an antiseptic, hygroscopic, emollient and stimulant, he justly remarks, is likely to prove serviceable, not only for the induction of premature labour, but in all cases where, at the close of pregnancy, it becomes necessary to hasten the labour. "Among these," he says, "are to be reckoned the accidents which threaten the life of the mother or children, such, *e.g.*, as eclampsia." The results of its employment in the case before us fully justify the anticipation thus expressed.

Following up his further suggestion, that it might be helpful for the promotion of labour in cases of protracted first stage, we made trial of glycerine injections in four other Maternity cases, with encouraging results. Thus, in an viii-para with a small pelvis, where the os only admitted the finger-tip after the first stage had lasted fifteen hours, an ounce of glycerine was injected, and in four and a half hours afterwards, without any other interference, the os was fully dilated. In a i-para, where, after the lapse of fifteen and a half hours, the os only admitted the finger-tip, half an ounce of glycerine was injected, with the like result of full dilatation of the os in four and a half hours. In the other two cases the observations were not so simple, as in one of them morphia and chloral had also been administered; and in the other, a case of placenta prævia, a Barnes' bag was used to promote the dilatation. In both of them, however, the influence of the glycerine injection in promoting uterine action was quite observable.

I may add that on a recent occasion my friend Dr James Young sent for me to see with him an elderly primipara, in whom the first stage had been going on for a day and a night without producing dilatation of the os beyond the size of a two-shilling piece. I could not meet him at once, as I had an engagement at Portobello, but asked him in the meantime to make use of the glycerine injection. When I arrived, two hours later, the canals had become sufficiently dilated to allow of the extraction of the child with forceps. Dr Young remarked that the glycerine had worked like magic in stimulating the uterine action and releasing the rigid tissues, and wondered that he had never before heard of its virtues in this respect.

It should be observed that there were found to be indications of sugar in the urine that was first drawn off from our patient after

her admission to the Maternity, which was, no doubt, rightly enough attributed to the injection, and might indicate the partial absorption of the glycerine. For it is believed to be eliminated in the urine in a form which gives some of the reactions of sugar; and it may be well to bear in mind that, if absorbed largely, it is said to cause hæmoglobinuria.

As to the manner of application of the glycerine, it will be seen from the record that two different methods were adopted. At one stage cotton wadding soaked in glycerine was introduced into the cervical canal. This is the method suggested by Kehrer[1] in his account of the different procedures that may be adopted for induction of premature labour. He is the only other obstetrician besides Pelzer who seems to have made use of glycerine in this direction, and all he says is,—"Tamponing of the cervix with glycerine-wadding has proved itself a means of exciting strong pains in several cases recently observed in our klinik, and is therefore worthy of further trial. Perhaps the glycerine acts on the uterine musculature in the same way as the Oidtman glycerine clysters on the bowel." Its application in this manner, however, did not seem to produce such satisfactory results as the direct injection of the fluid through the os internum into the lower segment of the uterus in the manner advocated by Pelzer. When care is taken to fill the syringe to the very nozzle with glycerine, so that all air is expelled, the procedure seems to be unattended with any danger. One, two, or three ounces are slowly injected, and though some of the fluid may escape at once past the tube, a sufficient quantity passes in between the membranes and the uterine wall, and lodges there, to produce the desired effect. This seems to come about very speedily, as the uterus soon begins to contract if it has been previously quiescent, or to contract more vigorously if the pains were feeble. In cases where the uterine action is not so energetic as is desirable, the injection may be repeated; and I see no reason why it should not be repeated again and again, although, as far as experience goes, the second injection proves sufficient.

The experience as yet is admittedly very limited. But it is at least sufficiently encouraging to warrant me in bringing Pelzer's procedure under your notice, and commending it to your careful consideration and practical application.

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MEETING IV.—FEBRUARY 8, 1893.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr Robert Bell*, Glasgow, exhibited an OVARIAN TUMOUR, together with some of the semi-solid contents which were adhering to the walls of one of the cysts. The weight of the tumour,

[1] *Die Operative Geburtshülfe*, p. 40.

together with the fluid and other contents, was 20½ lbs. It was removed this morning through an incision, three inches in length, from a woman aged 33, the mother of nine children, the last of which was born six weeks ago. The tumour was multilocular, the first cyst which was punctured containing a claret-coloured glairy fluid, at the base of which was situated a considerable amount of placenta-like tissue. The next cyst that was emptied contained a substance very much resembling fæces in its appearance, of an olive-green colour, and having a slightly fæcal odour. The next two cysts, which were of considerable size, were filled with quite a limpid fluid. Thus there were three different characters of cyst in the one tumour. Upon the surface of the tumour was spread the Fallopian tube, with the fimbriated extremity spread out and closely adherent to the cyst wall. The pedicle was all that could be desired, and although adhesions were pretty extensive over the whole external area of the cyst, these were easily broken down, and the tumour was removed without any difficulty. The left ovary was also cystic, and the tube, which was highly congested, was considerably distended by a serous fluid. These, therefore, were also removed, with the view of doing away with any possibility of future mischief. The case is specially interesting, because of the fact that the patient is the mother of nine children at the comparatively early age of 33. In ordinary circumstances one would have feared that the cyst would rupture during labour, but, so far from this, it did not either materially impede delivery nor interfere with her recovery. The cyst, however, had taken on a very much more rapid growth since her confinement. The parietal peritoneum was very much thickened and highly congested, giving rise to a suspicion that possibly there might be some malignant disease present.

*P.S.*—This patient returned to her home twenty-seven days after the operation perfectly well.

## II. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

(SECOND SERIES.)

### II. Allantoido-Angiopagous Twins—Paracephalus Dipus Cardiacus.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Diseases of Women, Medical College for Women, Edinburgh; Physician for Diseases of Women and Practical Obstetrics, Western Dispensary, Edinburgh; and Secretary to the Edinburgh Obstetrical Society.

Having in a previous communication given an account of the appearances found in an allantoido-angiopagous twin of the paracephalic variety, I may now proceed to gather together the details

of similar specimens that have from time to time been recorded by other observers. In this way some light may be expected to be thrown upon the general characters of these deformed fœtuses and upon their mode of origin.

## The Paracephalous Twin.

*Definition.*—As has already been stated, Taruffi has arranged together in one group all those allantoido-angiopagous twins that are in possession of a head, and has given to them the name "paracephali." The word is not a new one, but the sense in which it is employed is novel. Geoffroy Saint-Hilaire originally suggested the term "paracephalus" for one of the groups into which he subdivided the single monsters of the order of the omphalosites. He stated that the four leading characteristics of the paracephalian fœtus were as follow:—(1), The marked deviation of the whole body from its normal symmetry; (2), the imperfect state of the limbs, as to their form and proportions, or as to the number of digits; (3), the absence of many of the thoracic and abdominal viscera; and (4), the existence of a head, very imperfectly formed, but recognisable as such on external inspection. The paracephalian fœtuses of Saint-Hilaire's classification were not recognised by Förster as a separate group, but were placed by him among the acephali under the designation of *acephalus paracephalus.* Ahlfeld, again, grouped the paracephali in a subordinate position among the acardiaci, and gave to them the name *acardiaci ancipites.* In their attempt to arrange Saint-Hilaire's paracephalians according to the German classification, founded upon Elben's investigations, Förster and Ahlfeld introduced some degree of confusion into the whole subject. From the mode of arrangement adopted by these two teratologists it would have been difficult for them to have framed definitions at all in accordance with the names given to the monsters, for Förster would have been compelled to have admitted that his headless fœtuses had in this group a head, and Ahlfeld would have had to state that his head-bearing heartless fœtuses sometimes had a heart. Ahlfeld, indeed, recognised that these monsters were always born along with normal twins, and that they were united with them through their allantoidal vessels—that they were, in fact, allantoic or placental parasites; but he did not fully realize the importance of this fact from the point of view of their classification. Taruffi was the first to recognise the great importance and interest of this group of terata, and to see that it was necessary to remodel the existing systems of classification and nomenclature in order to bring them into conformity with recent teratological discoveries and advances. Ahlfeld had placed them with the double monsters and amongst the allantoic parasites, and thus far Taruffi followed his example; but the latter writer also saw that it was paradoxical to put them with the

acardiaci, and that it was necessary to place them in a group by themselves. Not wishing to coin a new name, Taruffi took Saint-Hilaire's original term "paracephalus," and slightly modified its meaning to suit the requirements of the case. He recognised that the common character of this group of omphalo-angiopagi was the presence of a head, and that this head was not always very imperfect, but might be nearly, if not quite, normal. He further found a place among the paracephali for the acormic monsters of Förster's classification. He therefore used Saint-Hilaire's term in a corrected and extended sense, and was able to frame the following definition:—*A paracephalic fœtus is an omphalo-angiopagous twin which has the head (cranium or face) and the limbs more or less defective, and which sometimes has in addition to the absence of the lower limbs that also of the trunk.* I accept this definition, but substitute *allantoido*-angiopagous for *omphalo*-angiopagous.

*Varieties.*—Saint-Hilaire arranged the members of the family of the paracephalians in three genera: the first genus he called paracephalus, the second omacephalus, and the third hemiacephalus. Paracephalus he defined as an omphalosite with a defective yet large head, with a distinct face and mouth, with rudimentary sense organs, and with the upper limbs; the distinguishing character of the members of the second group was the absence of the upper limbs; and whilst the fœtuses in the third genus had arms, they had for a head only a shapeless mass, with some appendages or cutaneous folds in front. Taruffi, having the advantage of acquaintance with a much larger number of specimens than Saint-Hilaire, was able to construct a more correct and exhaustive scheme of classification. He adopted as a primary means of arrangement the state of the lower limbs and trunk, and thus obtained three chief groups, called—(1), *Paracephalus dipus*, in which both legs were present; (2), *P. apus*, in which there were no legs; and *P. pseudo-acormus*, in which the lower limbs were absent and the trunk very rudimentary. He regarded as a secondary character the presence or absence of the heart, and subdivided the variety paracephalus dipus into *cardiacus* (with a heart), and *acardiacus* (without a heart). It is doubtful whether Taruffi's classification will be found capable of including all the possible varieties of the paracephalic twin. Thus it scarcely provides a place for such a specimen as that lately described by me; that fœtus ought, in strict accuracy, to be placed between the dipus and the pseudo-acormus varieties, for whilst both lower limbs were present, there was practically no trunk. This objection might, however, be raised with regard to any scheme of classification, for all such must be to a great degree artificial; one form of monstrosity passes insensibly into another, and is not sharply defined. It would seem, however, that there might conveniently be established a variety to include fœtuses with one lower limb, *paracephalus monopus*.

## GROUP I.—PARACEPHALUS DIPUS.

About sixty specimens belonging to this group have been described by various writers, and of these the greater number were acardiac. The following definition has been proposed by Taruffi for the members of this group: they are "*twins, one of which is, it is true, furnished with a head, trunk, and lower limbs; but these parts are more or less defective, to say nothing of the upper limbs, which may even be absent.*" It will be convenient first to consider the fœtuses of this group which are provided with a heart, and thereafter those that are acardiac.

### SUB-GROUP I.—PARACEPHALUS DIPUS CARDIACUS.

*Historical Notes.*—It would seem that very few specimens of this form of monstrosity have ever been put on record, for I have only been able to find about twelve instances in which the evidence seemed sufficient for purposes of identification; but several other cases have been noted, in which, although some of the necessary details were absent, there appeared to be every probability that they were also paracephali with a heart. Possibly some observations of anencephalic fœtuses born along with normal twins should find their place in this group, *e.g.*, the case[1] reported for Dr Paterson by Professor A. R. Simpson to this Society in March 1877; but in the absence of details concerning the placenta, such observations must be neglected.

The specimen somewhat imperfectly reported by Jaenis in 1673 seems to have been the first of this variety of monster ever recorded. Nearly a hundred years passed before Roederer noted another; his description extended to nearly eighty pages, and was a masterpiece of accurate and minute dissection. In the present century Uccelli, Vrolik, Tamm, Brandau, Orth, Santi Serena, Horder, Martin, Jaggard, and Page have all recorded, in a more or less complete way, deformed twins of this kind, and Metzner observed a case of triplets, one of which was a heart-bearing paracephalus. Specimens which in all probability also belonged to this group were those put on record by Poppel, Nieberding, Brown, and Smith and Birmingham.

*Synonyms.*—The authors who described fœtuses belonging to this group gave to them very various names. Jaenis entitled his communication "De Infante sine Capite," Roederer called his "Fœtus Parasitici Descriptio," Metzner used the phrase "De insigni quodam partu trigemino," and Vrolik that of "Beschryving eeniger merkwardige Missgeborten." Other writers described their specimens as "acardiaci." Brown called his "A peculiar Acephalous Monster," Jaggard noted "A Case of Fœtal Aplasia," and Page

[1] *Edinburgh Medical Journal*, vol. xxii., 1877, p. 1130.

described his example as a "Mylacephalous Acardiac Twin."[1] Tamm, Nieberding, and Smith and Birmingham paid special attention to the marked condition of anasarca present in their specimens, and named them accordingly. In only one instance (14A) was the term "paracephalus" employed by the original observer. No uniform nomenclature was adopted, and most of the writers showed by their expressions the difficulty they had experienced in finding suitable names for their specimens. Ahlfeld's term "Acardiacus anceps" must be regarded as synonymous with "paracephalus dipus cardiacus."

## Clinical Details.

In many of the recorded cases the circumstances connected with the birth of paracephalic fœtuses of this variety are very imperfectly stated, and in some instances no clinical details at all are reported. In all the cases the pregnancy which ended in the birth of a deformed fœtus was plural; in sixteen instances it was twins, and in one (No. 4) it was triplets.

*Maternal History.*—The previous general health of the mother was not often touched upon by writers; but in Nos. 7, 13, and 15 it was said to have been good, and in No. 17 it was noted that there was no history of syphilis. The mother's age was only occasionally given: it was 24 in No. 4, 26 in No. 7, 27 in No. 1, 35 in No. 17, and 37 in No. 12. She was multiparous in most of the cases in which her condition as regards parity was noted: she was a ii.-para in No. 4; a iii.-para in Nos. 1, 2, and 5; a iv.-para in No. 7; a v.-para in Nos. 6 and 14; a x.-para in No. 17; and a "multipara" in No. 16. She was, however, a i.-para in No. 12. The previous obstetric record was frequently a bad one: in No. 1 there had been first an abortion at the third month and then a well-formed living male infant; in No. 2 the first child, a female, was an imbecile, and the second, also a female, was affected in the same way; in No. 7 the mother had had, by her first husband, four well-formed children, she remained a widow for seven years, she then re-married, and gave birth to a paracephalic fœtus; in No. 7 there had been previously two healthy full-time infants and one abortion; and in Nos. 4, 14, and 17 the earlier labours had been normal. In no instance is there any history of a previous plural gestation.

The pregnancy which resulted in the birth of a paracephalic fœtus was, as has been said, always plural—at least this is inferred, if not absolutely stated; and it often came to a premature conclusion. Labour occurred at the twentieth week in No. 15; at the sixth month in Nos. 4 and 13; at the seventh month in Nos. 7, 14, and 16; at the eighth month in No. 6; and at the full term in No. 17.

The pregnancy was complicated by hydramnios in Nos. 13 and

[1] Doran, however, in the discussion that followed the reading of Page's paper, maintained that the monster was an "Acardiacus Paracephalus."

16, and in the latter it was noted that there was severe vomiting in the early, and great dyspnœa in the later, months. The normal twin was nearly always the first born; it was distinctly stated to have been so in Nos. 5, 6, 7, 12, 14, and 17, but in No. 16 it would appear, although the statement is not quite clear, that the monster was first expelled. In No. 4 (triplets) the deformed fœtus was preceded and followed by normal infants. Further details of the confinement were in some cases given: in No. 5 the normal infant presented by the vertex, whilst the monster came as a footling, and was delivered along with the placenta without interference; in No. 6 the deformed fœtus was born five hours after the normal one; in No. 7 the well-formed twin presented by the shoulder, whilst the monstrous one came as a footling; in No. 12 the healthy infant was delivered after two days' labour-pains, the paracephalus came away soon afterwards, and there was considerable hæmorrhage; in No. 14 the monster presented by the breech; in No. 16 forceps and digital traction were required to deliver the malformed infant; and in No. 17 both fœtuses presented by the head. The puerperium was probably always normal; it was distinctly stated in Nos. 4, 12, and 16 that the mother made a good recovery.

*Paternal History.*—The health of the father was in only a few cases referred to; it was said to be good in Nos. 13 and 17. The fact that in No. 6 the children by the first husband were normal, while those by the second were allantoido-angiopagous twins, is perhaps of some importance as suggesting the possibility of paternal influence.

*Infantile History.*—In all the cases the deformed twin was necessarily dead-born, but in no instance is there a record of advanced maceration. Probably death took place at the time when the cord of the normal twin was tied. The well-formed twin was dead-born in Nos. 2, 7, and 13; and it died soon after birth in Nos. 14 and 16. In Nos. 12 and 17 the co-twin was living when born, and probably survived. The twins were of the same sex in all cases, with one doubtful exception (No. 6); they were both males in Nos. 1, 3, 8, 9, 12, 14, 15, and 17, and they were both females in Nos. 2, 5, 7, 10, 13, and 16. In No. 4 the three fœtuses were females: the first born had a tumefied abdomen, and lived twenty minutes, whilst the last born lived an hour and a half.

## Morbid Anatomy.

### I. Of the Fœtus.

*a. General External Appearances and Measurements.*—In all the recorded cases the paracephalic cardiac fœtus was markedly monstrous in appearance, as a reference to the drawings given by Jaenis, Roederer, Metzner, Tamm, Smith and Birmingham, Jaggard and Page will demonstrate. The deformity was in great measure due

to the advanced anasarcous state of the subcutaneous tissue especially in the region of the head and neck, but it was also caused in some instances by the exceedingly rudimentary condition of the cephalic extremity of the fœtus. The paracephalous twin varied greatly in length: it measured 25 cms. in No. 12; 27 cms. in Nos. 6 and 9; about 30 cms. in No. 1; 33 cms. in No. 7; 37 cms. in No. 17; and 38 cms. in Nos. 2 and 16. Its weight also varied greatly: it was 3 lbs. in No. 2; about 1300 grammes in No. 17; 8 lbs. in No. 7; 3600 grammes in No. 12; and 10 lbs. in No. 16. It was smaller than the normal twin in No. 2, but larger in Nos. 13, 14, 15, and 16. In No. 4 the first born and normal fœtus measured 24·5 cms.; the second (monstrous) one measured 18·5 cms.; and the last born (normal) one 27 cms. In Jaggard's case the normal infant weighed 4½ lbs., and the monster 10 lbs; and in Smith and Birmingham's case the paracephalous infant was three times as large as the well-formed one. The large size of the malformed fœtus was chiefly to be ascribed to the anasarca, for the skeleton was usually small.

*b. State of the Subcutaneous Cellular Tissue.*—Nearly all the writers who have put on record specimens of this variety of paracephalus were struck with the markedly œdematous state of the subcutaneous cellular tissue. Sometimes the œdema was described as gelatinous in character (Nos. 2, 7, and 15), sometimes as serous (Nos. 3, 6, 9, 12, and 16). It was generally universal, but in No. 7 it did not affect the lower limbs. Some authors noted that beneath the skin were true cystic cavities. There were such cysts on the back of the neck in Nos. 2 and 4, on the head in Nos. 6 and 7, and all over the body in No. 9. The subcutaneous tissue was described as fatty by Poppel (No. 5).

*c. State of the Head.*—The degree of deformity of the head varied in different specimens; in some there was scarcely any malformation (No. 8), and in others there was only a shapeless mass representing the cephalic extremity (Nos. 1, 6, 14, and 17). The specimen described by Jaenis (No. 1) showed no face; but the writer thought that he recognised in some irregular projections on the nape of the neck the rudiments of a mouth, eye, and tongue. He concluded that the face looked backwards, but no doubt what he looked upon as features were simply irregular cutaneous folds. There was no cranial cavity and no brain. Roederer (No. 2) gave a very complete description of the head in his specimen. In addition to the deformity caused by the serous cysts in the neck there was a fissure of the upper lip on the left side, the eyelids were somewhat deformed, the nares were closed anteriorly, there was only a vestige of the external auditory meatus, and the membrana tympani was absent. A large quantity of fluid was found in the cranial cavity, along with a certain amount of brain substance (internal hydrocephalus), and hairs were present on the vertex. There were various malformations of the bones of the head, and

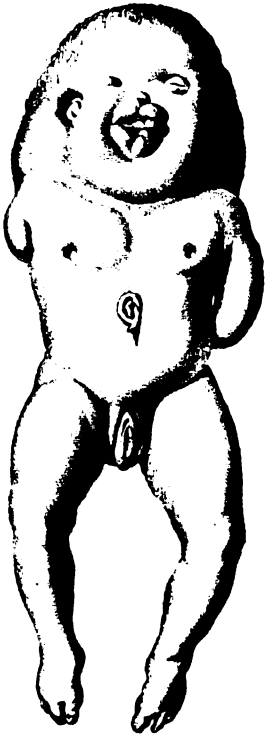

*Fig. 1.*
**Roederer's Paracephalic Fœtus.**

*Fig. 2.*
**Metzner's Paracephalic Fœtus.**

Wm CATHIE. LITH

the vomer was absent. In No. 3 the bones of the cranial vault and upper part of the face were absent; the alveolar border of the upper maxillæ and the lower jaw, which was anchylosed to the glenoid cavity of the temporal, were present; in the middle line was a small transverse slit, with a tongue and a rudimentary lip, leading into a blind buccal cavity; at the sides were two small rudiments of ears; and the brain, like that of a fish, consisted of a small tubercle. The cerebral membranes formed a sac containing serum. Metzner's fœtus (No. 4) showed a membranous cranial vault containing a few vestiges of bone; the brain was semi-fluid; there was corneal staphyloma; and there was a median hare-lip, and atresia of the nasal cavities posteriorly, along with absence of the anterior nares. The buccal and cranial cavities communicated through a fissure in the body of the sphenoid. In No. 5 there was muddy fluid in the cranium; and a bean-sized brain-rudiment, containing ganglion cells and fat crystals, lay on the basis cranii. Vrolik (No. 6) gave a very complete description of the head in his specimen. It was a shapeless mass with some indications of a face anteriorly (mouth, lips, flattened nose, imperfect eyelids, and shapeless ears); there was a cystic cavity containing serum on the vertex; within the cranium was a sac containing fluid, whilst below it was the rudiment of a cerebrum and a normal cerebellum and medulla oblongata; in each of the orbits was a vascular pigmented membrane like the choroid; there was a cartilaginous auditory meatus on the left side, but none on the right; there were traces of the pituitary gland and of the 5th, 7th, 8th, and 10th pairs of cranial nerves; the nasal processes of the frontal bone were widely separated by a membranous space, and the nasal seem to communicate with the cranial cavity; the nasal bones, the ethmoid, and the zygomatic processes of the malars were absent; the right temporal had no zygoma and no annulus tympanicus, but these were present in the left; the pharynx and larynx ended blindly; there was partial anchylosis of the lower jaw; and the upper part of the cranium was in great part membranous. In Tamm's specimen (No. 7) the head was like that of an eagle-owl, the right half was larger than the left, there was a meningocele at the root of the nose, and there was both internal and external hydrocephalus. In No. 9 there were cystic tumours on the head; the cranial cavity, which had previously been opened, contained only a pulpy mass of connective tissue in which no nerve elements were found; and there was on the left side of the head a thick œdematous skin-sac reaching as low as the elbow, and giving an asymmetrical appearance to the cephalic end of the monster. In Santi Serena's case the head was small, and was surmounted by a little soft tumour; the ears were rudimentary, the eyes small, and the nose flattened; the lip had a double fissure extending into the palate; the lower jaw was small; the oral cavity ended blindly posteriorly; the cranial cavity was very small,

had thin walls, and an aperture at the level of the sagittal suture, and it was filled with loose vascular connective tissue continuous with the small tumour on the vertex of the head; there was no ethmoid, the optic nerves were absent, and the optic foramina were scarcely marked. In No. 11 the head was hemicephalic, and the eyes atrophic. In No. 12 the head was a shapeless mass, and in No. 13 it was greatly deformed by œdema. The cranium in Brown's case (No. 14) was small (size of a walnut), was covered with skin bearing a few stunted hairs, and contained some brain tissue. In No. 15 the head and face were greatly deformed by the anasarcous state of the subcutaneous tissue. Jaggard's specimen (No. 16) had a bullet-shaped head; the ears were rudimentary (the right one had no meatus); the palate and both the superior maxillæ were cleft; the tongue was rudimentary; imperfect eyelids marked the position of the eyes, while that of the nose was indicated by a double fissure; inside the cranium the meninges were firmly matted together and had a thin layer of brain substance attached to them; the cavity was filled with cerebro-spinal fluid; the basal ganglia were very small; and there were no olfactory or optic nerves. Finally, in Page's specimen (No. 17) the cephalic extremity consisted in a soft globular mass rigidly fixed in a direct line with the trunk; there was no trace of a mouth; there was a small conical protuberance, like an ear, to the left of the middle line,—this was found to be the nose; there was above this a slit suggesting a rudimentary palpebral fissure; above it was a small circular foramen like a defective membrana tympani, and there was a similar smaller one on the opposite side; the cephalic end contained dark straw-coloured serum, with a sp. gr. of 1027, an alkaline reaction, and with 4·3 per cent. of serum albumen; the only portion of bone present was the palatine process of the superior maxilla; there were no traces of teeth, orbits, internal ears, or brain substance; and behind the superior maxilla was an ovoid cavity, probably an expansion of the spinal foramen of the 5th cervical vertebra.

*d. State of the Vertebral Column.*—In many cases (Nos. 1, 4, 5, 11, 14, and 15) there were no details given of the spine, and in some others (Nos. 2, 7, 12, and 13) it was probably normal. In No. 3 there were no cervical vertebræ, and the occiput articulated with the first dorsal vertebra; there was spina bifida, and the spinal cord was relatively large, and had a normal consistence. In Vrolik's specimen (No. 6) some of the cervical and some of the dorsal vertebræ had their spinous processes united; the lumbar part was normal, but the sacrum turned backwards, producing an imperfect state of the posterior pelvic wall. In No. 10 there was dorso-cervical kyphosis. In No. 16 a tumour filled with cerebro-spinal fluid occupied the right side of the thorax and abdomen, and was continuous with the membranes of the spinal cord by a pedicle passing between the seventh cervical and the first dorsal vertebra.

Page's specimen (No. 17) had a curve with concavity forwards in the cervical region, and a distinct angular curvature with slight lateral deviation in the dorsal part; the first four cervical vertebræ were absent, but the cord was present.

*e. State of the Upper Limbs.*—In some of the specimens (Nos. 6, 8, 14, and 17) there were no traces of upper extremities, in others they were normal save for the œdema (Nos. 13 and 15), and in others they were present in a more or less deformed state. In No. 1 the right arm was much longer than the left; in No. 2 the right was represented by a short tuberosity, and the left was turned backwards and ended in a tubercle; in No. 4 the left arm was very short, and was marked by a groove caused by the umbilical cord, and the right was represented by a rudimentary digit; in No. 7 there was no trace of arm or hand on the right side, and on the left was a claw-like rudiment of a hand with two fingers; in No. 9 the arms were short and the fingers scarcely recognisable; in Santi Serena's case (No. 10) the right arm was a small prolongation ending in two small lobes, while the left was complete, but concealed in great part by the skin of the thorax; in No. 11 the arms were well developed, but the hands were defective; in Martin's specimen (No. 12) there were mere traces of the arms,—on the right side were two normally formed nail-bearing fingers, and one such on the left; and in No. 16 the right arm possessed only a radius and an ulna, and was united to the side of the abdomen, while the left arm was adherent to the thorax as far as the elbow, and the hand was clubbed with a rudimentary thumb and two rudimentary fingers.

*f. State of Thorax and its Viscera.*—In all the specimens there was some trace of a heart. In Nos. 7 and 15 the heart was normal, or nearly so; and in No. 13 it was hypertrophied, especially on the left side, and showed premature closure of the ductus arteriosus. It was also normal, so far as can be made out, in No. 1; but in all the other cases it was more or less defective. In No. 2 it was formed by the sinus of the vena cava, which opened into a single muscular ventricle, which had no communication with aorta or pulmonary vessels. In No. 3 the heart was rounded; there was one ventricle, from which arose the aorta, and one auricle, which was really nothing more than a sinus on the large vein continuous with the umbilical vein. In No. 4 the umbilical vein passed direct to the heart, which did not give origin to the aorta. In this case also the heart was much smaller than in the two accompanying normal fœtuses. Poppel was unable to make a complete dissection of his specimen, so the presence of a heart in it must remain doubtful. In No. 6 there was a large heart, consisting of a venous sinus and a ventricle; the right and left jugular veins opened into the former, and from the latter arose the aorta. In No. 8 there was a heart with two ventricles; and in No. 9 it had two cavities,—the left had small muscular

trabeculæ and thin walls, whilst the right had thicker walls; there were no valves, and the heart was not in relation with the great vessels, but from the upper end of the left cavity arose a small vessel which passed upwards, whilst at the lower end a similar vessel entered the heart at the spot where the two cavities opened into one another. In No. 10 the heart had a single ventricle (the left), which communicated with its auricle and with the aorta; into the auricle opened the two venæ cavæ. In No. 11 the heart gave off one vessel and one entered it, whilst in No. 12 it was a thin-walled sac with trabeculæ on walls and greasy contents. In No. 14 the heart consisted of two cavities, and was developed to the degree seen at the second month of fœtal life. In No. 16 the auricles were well developed and communicated freely; the right ventricle was greatly hypertrophied, and the left, which was rudimentary, opened into it; and in No. 17 it was rudimentary and single chambered,—there were no valves, and the only vessels were an archless aorta and an inferior vena cava.

A diaphragm was present in Nos. 1, 2, 3, 5, 7, 10, 12, 13, and 15; but absent or imperfect in Nos. 4, 6, and 17, and probably also in Nos. 8 and 9. The thymus gland was stated to be absent in Nos. 4 and 16; it was present in Nos. 2, 3, and 7, and details concerning it are wanting in the other cases. There were no lungs in Nos. 2, 3, 4, 10, 12, 14, 16, and 17; the left was small and the right absent in No. 7; and both were small or rudimentary in Nos. 1 and 11. It was definitely stated that the œsophagus was absent in Nos. 2, 3, and 6; it was probably so in many other cases; and it ended blindly in No. 7. There was no trachea in Nos. 3, 6, and 16; it ended blindly in No. 7; it was probably wanting in several other instances; it was well developed, however, in No. 11. The thoracic cavity contained fatty or œdematous cellular tissue in Nos. 2, 5, 6, 9, and 12, and fluid in Nos. 7 and 13. A sternum was absent in Nos. 5, 6, 9, and 10; it was bifid in Nos. 2 and 4; and it was probably defective in other instances. The ribs were slightly defective or imperfect in Nos. 2, 10, and 17; in No. 6 there were only four on the right and six on the left side. The clavicles were twisted abnormally in No. 3; they were absent in No. 10. The thoracic duct was absent in No. 15, and the thyroid gland in No. 16.

*g. State of Abdomen and its Viscera.*—In the case of the abdomen, as in that of the thorax, paracephalic fœtuses presented extraordinary abnormalities. In some cases, on account of the absence of the diaphragm, the abdominal and thoracic cavities communicated freely (*e.g.*, in No. 6); and in nearly all the recorded instances the viscera were markedly defective. The liver was described as small in Nos. 9 and 10, and it was absent altogether in Nos. 2, 3, 4, 5, 12, 14, 16, and 17; it was present and of large size in No. 1. The spleen was small in size in Nos. 7 and 12, and altogether wanting in Nos. 1, 2, 3, 5, 14, 16, and 17; it was probably present

in Nos. 13 and 15. There was a stomach, but an imperfect one, in Nos. 10 and 14; there was none in Nos. 1, 2, 3, 5, 12, and 16; and it may be concluded that this organ was fairly normal in Nos. 7, 9, and 17. The absence of the pancreas was noted in Nos. 2, 3, 9, 16, and 17. The intestines usually formed some imperfect coils, terminating blindly at one or both ends, and having a shortened mesentery. This was their general condition in Nos. 1, 2, 3, 5, 6, 9, 10, 12, 14, 16, and 17. In No. 3 there was a small, and in No. 4 a large, umbilical hernia. The intestines were narrow, and contained much fluid in No. 7; they were described as adherent to each other in No. 12; and there were no mesenteric glands to be seen in No. 15. The condition of the kidneys varied somewhat: both organs were present in Nos. 2, 5, 6, 7, 9, 10, 12, 13, and 16; one was absent in Nos. 1, 3, and 17; and although both were represented in No. 14, one was very rudimentary. Both ureters were reported as present in Nos. 2, 4, 7, 9, 10, and 16; one was absent in No. 3, and both were wanting in Nos. 5 and 6. The bladder was stated to be present in Nos. 2, 3, 4, 6, 9, 10, 12, 13, and 17; but it was described as small, with thick walls, in three of these (Nos. 3, 9, and 12). In No. 16 there was no proper bladder cavity, for the ureters opened along with the intestine into a cloaca in the position of the vagina. The urethra was stated to be absent in No. 6; it was present, but imperforate, in Nos. 9 and 10; and it was described as pervious in Nos. 7 and 13. The uterus was absent in Nos. 10 and 16; its presence was noted in No. 2. The ovaries were absent in No. 16; they were in a primitive state of development in No. 10, and their presence was recorded in No. 2. In No. 4 the sexual organs were normal. It is possible that the structures described by Vrolik (No. 6) as testicles may have really been ovaries, for the other twin was a female; and in the deformed one the external genitals were entirely absent. If this explanation be not accepted, it must be admitted that this case offers the solitary exception to the general rule that such twins are always of the same sex. In Nos. 3, 9, and 12 the testicles were present, and in each of these cases their position was intra-abdominal; they were absent in No. 17. Finally, the presence of fluid in the abdomen was noted in Nos. 2, 7, and 13.

*h. State of External Genitals and Anus.*—The external genitals were those of the male in Nos. 1, 8, and 14, and in them the testicles were probably present in the scrotum. In Nos. 3, 9, 12, 17, and probably 15, whilst the penis was present, the testicles were absent from the scrotum. The female external genital organs were present in Nos. 2, 4, 5, 7, 10, 13, and 16. In No. 6 there were no external genitals at all. The anus was described as pervious in Nos. 2, 3, 10, and 17; but it was imperforate in Nos. 6, 9, 12, 14, and 16.

*i. State of the Lower Limbs.*—The lower extremities were normal

in Nos. 1 and 3, and in Nos. 13 and 15 they were œdematous. They were defective, but only as to the number of the toes, in Nos. 2, 4, 7, 9, and 11. The thighs were well developed, but the legs were atrophic in No. 10. In Nos. 12, 16, and 17 the toes were also defective and the feet were clubbed (equino-varus in No. 12, calcaneo-varus in No. 17), and there was no proper knee- or ankle-joint in No. 12. In No. 6 the trunk passed into a thick thigh, in which, however, two femora could be felt and two knees could be recognised; the legs were placed in the form of a cross, and were united by membrane; the fibula was defective in the left leg; and the right foot had four toes, of which one was bifid, whilst the left had only one.

## II. Of the Placenta, Membranes, and Cord.

The condition of the fœtal annexa is of great interest in the case of the paracephalic twin fœtus, and it is matter for regret that in several of the recorded examples (Nos. 1, 2, 6, 9, 11, and 15) information on this matter is not forthcoming. It is probable, however (if I may be allowed to judge from the other conditions found), that in these instances, as well as in Nos. 3, 5, 7, 12, 13, 16, and 17, the placenta was single. A solitary exception to this rule is found in No. 14; but in this case it is stated that whilst the placenta of the normal twin was larger than normal, and had a cauliflowered edge, that of the monster was about the size and shape of a normal adult kidney, so that it is very probable that here also there was at least a vascular connexion between the two after-births. In Nos. 3, 5, 13, and 17 it is stated that there were two distinct amniotic sacs, and it is very likely that this was the case in most of the other examples, although the fact is not recorded. In No. 4 the placenta was biscuit-shaped; its smaller part nourished the last-born (normal) fœtus, which lay in a separate chorionic sac and had one umbilical cord; its larger portion had attached to it two cords, one passing to the first-born (normal) fœtus, the other to the monster; these two cords were united by a communicating branch, and the two fœtuses lay in a single chorionic cavity. The liquor amnii was excessive in amount in the sac containing the malformed twin in No. 13; but there was no fluid at all in it in No. 14, so that the membrane was in places adherent to the fœtus.

The relations of the umbilical cords were very interesting. In No. 2 the cord of the monster contained two veins, one of which passed upwards on the left side to furnish the subclavian, jugular, and thyroid veins, whilst the other (the smaller) opened into the inferior vena cava. In No. 3 the cord of the normal twin arose from the margin of the placenta, and from it took origin that of the malformed fœtus, the umbilical vein passing direct to the auricle. In No. 5 the cord of the living twin contained two arteries and one

vein; one of the arteries divided into two branches, one of which passed to the placenta, whilst the other went to help to form the cord of the monster; the other artery was normal; and the umbilical vein at its entrance into the placenta divided into four branches, one of which split into two, and one of these passed in the membranes to the monster. In Vrolik's paracephalus (No. 6) the cord contained one artery and one vein, and the latter did not communicate with the heart, but formed a venous sinus in the abdomen. In No. 7 both the cords were inserted near the centre of the placenta, and between them there passed a small communicating vein; there were thrombi in the vein of the malformed twin. There were two umbilical veins in the cord of the monster described by Brandau (No. 8), one of which passed to open into the vena cava superior, whilst the other entered into the vertebral canal. In the umbilical stump in No. 9 there was one artery, which passed upwards to the arms and head after giving off a branch to the lower limbs, and one vein, which lay on the left side of the spine and supplied branches to the lower limbs. In No. 12 the cord of the deformed twin contained two arteries and one vein; the vein divided near the pelvic brim into numerous branches with a wide distribution; the right umbilical artery gave off branches to the right leg, to the mesentery, etc., and then passed into the thorax like the ascending aorta, whilst the left artery went straight to the lower limbs and pelvic cavity; the cord of the normal fœtus was united to that of the monster about 3½ inches above the placental insertion, one of its arteries sent a branch to an artery in the cord of the other twin, and the veins of the two cords were united. In No. 14 the cord of the monstrous fœtus was described as of normal length and thickness, whilst that of the normal twin was unusually short. In No. 16 the relation of the cords was not investigated, but it was noted that the umbilical vein of the paracephalic fœtus opened directly into the right auricle. Finally, in No. 17 the cord of the well-formed twin was normal; that of the monster was smaller, and had no twists; its vessels were an artery and a vein, and these anastomosed with the vein and with one of the arteries of the normal funis; the deformed cord was inserted into the fœtus to the left of the sternum in the fifth and sixth intercostal spaces.

## General Characters.

An analysis has been given of the various clinical and pathalogical facts that have been recorded by the various writers who have described paracephalic fœtuses with hearts, and it is permissible to draw from it the following general conclusions:—

1. The fœtus paracephalus dipus cardiacus is always the product of a plural pregnancy; usually there is one other fœtus in utero, but sometimes there are two.

2. The co-twin is generally normal in appearance, but it is often

born dead, or dies soon after birth. It is always of the same sex as the paracephalic fœtus (No. 6 was a doubtful exception), and it is nearly always the first to be born.

3. The mother is almost invariably a multipara, is usually somewhat advanced in years, and has often had a bad previous obstetric history. In no case is there the record of a previous twin-confinement.

4. The pregnancy which results in the birth of a paracephalic fœtus nearly always terminates prematurely, and is occasionally complicated by hydramnios. The fœtus is unable to live separate from the mother.

5. The possible existence of a paternal etiological influence is suggested by the circumstances detailed in No. 6.

6. The paracephalic fœtus has external appearances which are always markedly monstrous; it is generally small in size, but is sometimes larger than its co-twin; and it nearly always shows an œdematous state of the subcutaneous tissue.

7. The head is usually greatly deformed, the brain hydrocephalic, and the face very imperfect.

8. The upper limbs are nearly always defective, and are generally very markedly so; the lower limbs, on the other hand, are always present, and are usually normal except as regards the number of toes.

9. The thoracic walls are sometimes defective; the heart is always present, but is nearly always greatly malformed, and is sometimes not in direct communication with the umbilical vessels; the lungs are often absent, and the diaphragm is sometimes wanting.

10. The liver, spleen, stomach, and pancreas are usually absent; the intestine is defective, and generally ends blindly; the kidneys, ureters, and bladder are in most cases present, but are sometimes defective; and the genital organs are occasionally imperfect or rudimentary.

11. The placenta is probably always single, for in No. 14, although it is stated that there were two placentas, it would seem that they had a vascular connexion; the amniotic sacs are usually separate; and the vessels of the umbilical cord of the deformed twin are usually defective, and communicate with those of the cord of the normal twin.

12. It would seem that the paracephalic fœtus with a heart must have in it two circulations,—one carried on by its own heart and the vessels connected with it, the other by means of the vessels passing to it from the normal twin; both these circulations are no doubt imperfect, and this imperfection is doubtless the cause of the œdema which is so common.

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*The President* said the Fellows had listened with interest to this new and valuable contribution which Dr Ballantyne had made to the subject of Teratology. These researches were all of importance, and Fellows would do a good service to the Society and to science if they sent to Dr Ballantyne all the specimens of deformed fœtuses that came under their observation. As to the special communication of the evening, the President thought that Dr Ballantyne would do well to adopt the designation Allantoido-angiopagus instead of Omphalo-angiopagus. The latter term, which was not yet widely employed, suggested the idea that the vascular communication between the twins took place between their omphalo-mesenteric vessels, whilst in reality observation seemed to show that the anastomosis took place among the vessels that go to form the placenta, and that are of allantoidal origin. It had struck him (the President), in listening to the paper, that it would be of some moment to study in these cases the relations of dropsical and myxœdematous conditions to the absence of the thoracic duct and of the thyroid gland; and it seemed to him further to be peculiar that the hydramnios should have been found

in the sac of the parasitic instead of in the sac of the well-formed twin. For the tendency of the production of hydramnios in twins had been attributed to increased renal secretion from the twin that was supposed to have the stronger heart and more active circulation.

*Dr Symington* agreed with the President in thinking that the term allantoido-angiopagus was preferable to that of omphalo-angiopagus for the group of monsters described by Dr Ballantyne. He desired, as an anatomist, to express his high appreciation of the scientific and practical value of Dr Ballantyne's teratological researches.

*Dr J. W. Ballantyne* thanked the President and Dr Symington for the kindly and encouraging remarks they had made concerning his communication. In reply to the President's questions, the absence of the thyroid was noted in only one case, and in that the œdematous state of the subcutaneous tissue was very marked. The absence of the thoracic duct was also noted only once. He had hesitated to coin a new name for the omphalo-angiopagi, but certainly Allantoido-angiopagus was the more correct designation, and he would in future adopt it.

## III. UTERINE ROTATION: ITS CLINICAL IMPORTANCE IN PREGNANCY AND LABOUR.

By James Haig Ferguson, M.D., F.R.C.P.E., M.R.C.S., Lecturer on Midwifery and Diseases of Women, School of Medicine; Obstetric Physician, New Town Dispensary, Edinburgh.

It is nearly four years ago since I had the honour of reading a paper to this Society on a Variety of Post-Partum Shock, some cases of which had come under my notice.

I ascribed the occurrence of the shock to bruising of the ovaries during the application of the Credé method in the third stage of labour, and stated my belief that owing to the frequent occurrence of uterine rotation in pregnancy, the ovaries are so situated as to be not uncommonly in danger of injurious compression during the expression of the placenta, and that this compression might produce alarming reflex manifestations.

With increasing experience I have grown even more confident of the very frequent occurrence of this uterine rotation, in the third stage of labour especially. Its amount varies in degree in different patients, but in the vast proportion of cases its existence is distinctly to be observed, and its amount easily appreciated. For a record of my previous cases *vide Edinburgh Medical Journal*, July 1889. See also similar cases recorded by Graham, *British Medical Journal*, May 1891, and by Newell, Leonard's *Illustrated Medical Journal*, Detroit, July 1890.

I propose to-night to adduce some additional facts in support of

my contention, as in my former paper I did little more than relate the cases and briefly state the conclusions at which I had arrived.

During the last three years I have received many voluntary and unsolicited corroborations of the truth of what I then stated, from medical practitioners whose clinical experience tallied with my own.

Recently Dr Webster, from a study of post-mortem and frozen sections, has stated that frozen sections do not support the statement that the uterus is rotated, and he further states that the method of frozen sections is a sure method, implying that its results must be absolutely correct. Now, against this assertion I feel bound to enter a protest. I agree with Fritsch when he says that "The position of the female genital organs in a living woman can only be determined by the examination of a living woman, and that post-mortem sections, whether frozen or not, are never capable *by themselves* of giving a decision as to their position in the living subject." On the other hand, I quite admit that examination of the living subject is, of course, always liable to error, and one can never claim for it absolute accuracy, owing to the impossibility of getting directly at the uterus, and the varying degrees of skill of different examiners.

Of this, however, I am sure, that rotation of the uterus, especially in the third stage of labour and immediately post-partum, can be better observed clinically than after death; and owing to the special facilities existing then, one can claim for one's clinical examination a very fair degree of accuracy, perhaps greater than under any other circumstances.

Rotation is to a great extent a vital property of the uterus; it tends to disappear when muscular contraction ceases, and to become undone by post-mortem gravitation. The greater the muscular contraction and retraction, the more marked (*cæteris paribus*) is the rotation. Such vital processes are apt to be overlooked in the conclusions which are drawn from the examination of frozen sections alone, and consequently the results of patient anatomical work often lose much of their practical importance. Take as an illustration the position of the apex-beat of the heart. If one were guided by post-mortem evidence alone, one would be led considerably astray. One would imagine it to be produced, as Vierordt shows, by the tip of the right ventricle, and to be further from the middle line than it is; whereas, as a result of a movement of rotation occurring during each systole, the apex of the left ventricle comes to the front and impinges on the chest-wall at a spot nearer the middle line.

The minute and careful descriptions of post-mortem frozen sections are interesting enough in their way, and have no doubt done a great deal to open up and elucidate much that is of importance as regards the relationships of parts which are more or less rigid or incarcerated, and whose position is not much affected by

death, and post-mortem changes, especially and notably,—for example, advanced pregnancy, the two first stages of labour, and certain cases of extra-uterine gestation.

They are, however, of no practical value whatever in alone determining the exact position of a freely movable organ, such as the body and fundus of the uterus, which even in life is affected by every movement of the body, and whose attitude, especially after labour, is to a great extent dependent on muscular vitality and tonicity. Especially does this hold good in the determination of the position of the unimpregnated uterus, the uterus in early pregnancy, and the uterus in the third stage of labour and post-partum. For in these circumstances the uterus is freely movable, not being unduly large, and consequently comparatively little influenced by outside pressure apart from the general abdominal pressure.

Webster found that in all his cases the walls of the uterus were bloodless, showing that strong muscular contraction had at one time existed. In frozen sections the post-partum uterus resembles a molluscous plastic mass, totally different to the impression it gives one clinically in the early puerperium of a firm, hard coherent body, with a definite shape and outline which can be easily recognised. The difference is simply that between life and death. The post-mortem uterus has lost none of its material constituents, but it has lost that subtle and mysterious thing called life, that which gave it form and vigour, and without which it is but a piece of inert matter dependent for its form and position on accidental circumstances. It is probable, however, that owing to the muscular degeneration and progressive absorption which takes place during involution, that uterine rotation becomes less distinct as the puerperium advances and muscular contraction ceases.

For these reasons I do not think we are justified in assuming that the position or relations of the puerperal uterus can be at all satisfactorily determined by post-mortem examination alone. The conclusions of such methods are certainly misleading, and are productive of no practical results.

## I. Position of the Uterus.

(*a.*) *Unimpregnated.*—It is now clearly established that the uterus, in addition to its inclination forwards, and its usual deviation to the right side, is rotated on its longitudinal axis in the vast majority of cases in such a way as to bring its left border forwards. This rotation, which occurs in the unimpregnated condition, and which has been described by Rouget, Claudius, Krause, His, Lusk, Spiegelberg, Martin, and others, becomes much more marked in the pregnant condition. According to Dohrn, Spiegelberg, and Olshausen, this rotation is caused mainly by the pressure of the rectum, during development, pressing on the left side. Pfannkuch

quotes Thiersch, who says that Müller's ducts often lie obliquely or perpendicularly to one another in embryonic sheep, and Dohrn says that in sheep, cattle, and human embryos the left duct usually lies further forward than the right. Pfannkuch says, "The inclination of the fundus to the right with rotation of the left edge forwards is a position which has already shown itself in fœtal life, and as regards essentials is to be traced back to the first development of the fœtal intestines." Spiegelberg thinks the weight of the uterus in the right lateral posture (which is the commoner) is another potent cause.

(*b.*) *During pregnancy* the rotation to the right on the longitudinal axis becomes still more evident, and, according to Chaignot, Charpentier, and others, is more marked during the last month. Schroeder, Stratz, Freund, Olshausen, and E. Martin have established this beyond the possibility of a doubt, and Charpentier, Spiegelberg, Kölliker, Lusk, Rouget, Bayer, Küstner, Winter, Tarnier, Claudius, Croom, Krause, and others all describe this marked rotation. Depaul remarks that in a pregnant uterus "Rotation is a fact which has been confirmed by numerous necropsies." Croom has noted in many cases that in pregnancy the anterior surface of the uterus looks to the right, so that the transverse axis of the fundus is in the right oblique diameter of the pelvis. Schroeder and Stratz, in a frozen section made on the body of a woman in labour at the beginning of the first stage, describe the uterus as deviating so much from the symmetrical position that its left border was turned forwards and downwards, its right border backwards and upwards. Winter also describes a frozen section which he made, in which the pregnant uterus lay exactly in the middle line with its left edge forwards. In another section which he made the bowels were enormously distended with gas, and he did not look for rotation. Few observers seem to have done so.

In certain animals—the cow, for instance—this uterine rotation is greatly exaggerated. Sometimes it takes place to such an extent as to twist the vagina secondarily upon itself, and so create a serious source of dystocia (Auvard, Charpentier). Dolèris, quoted by Charpentier, has observed a case where rotation was so great in a pregnant woman that there were "phénomènes d'obstruction graves" during the labour. This was due to a semi-pathological condition associated with abnormal relaxation of the pelvic tissues. The rotation in this case, strangely enough, was to the left.

A great many causes have been adduced to account for this rotation.

Spiegelberg thinks it depends mainly on an inherited tendency, but that it is increased by the small depth the abdominal cavity offers in the middle line, owing to the prominent spinal column, as well as by the force of gravity in consequence of most pregnant women lying on their right side.

E. Martin says that often in Cæsarean section, where lordosis was present, the uterus was so excessively rotated that its left border lay in the middle line anteriorly.

Schroeder and Stratz believe, from clinical observation as well as frozen sections, that this rotation of the uterus in pregnancy is due to the position of the child in utero. That side of the uterus which corresponds to the back of the child is always rotated forwards. They describe the breech as coming sideways out of the body of the uterus, the corresponding border of the uterus as turned forwards, and the corresponding ligamentum rotundum as being more tightly drawn, while the fundus sinks over to the opposite side. This they regard as the normal process. They further say, "If we regard the usual first position of the head, which is so frequent, we observe that while the ring of contraction moves upwards upon the child, the fundus inclines somewhat to the right—*i.e.*, to the side of the abdomen of the child. This is easy to recognise by the stronger tension of the left round ligament, because it is inserted higher than the right one. The left round ligament is clearly to be felt somewhat to the left of the median line, while the right is only to be felt sideways with difficulty."

In observations of 120 head positions, they found that in 102 the ligamentum rotundum, which corresponded to the back of the child, was rotated forwards. In other 15 cases it turned forwards after the emptying of the bladder, and only in three cases was the tension of the round ligaments the same on both sides, and in these three cases the breech went straight out forwards, while the fundus sank backwards. In no single case could they observe that the round ligament corresponding to the abdomen of the child lay forwards.

I cannot agree with Schroeder and Stratz in ascribing the rotation of the uterus to the position of the fœtus in utero. I am inclined to agree with Spiegelberg's views so far, but I think there are other causes which deserve to be brought forward.

The first is the traction exercised by the round ligaments. An important point to be remembered (which has been pointed out by Joulin, Depaul, Tarnier, and Chantreuil) is that the insertions of the round ligaments and of the tubes are found on the fully pregnant uterus nearly at the union of the anterior third with the posterior thirds of the organ. Stoltz has found that the round ligaments are quadrupled in size during pregnancy, and he finds that the right round ligament is shorter and thicker than the left. Schroeder and Stratz have proved that the left round ligament is inserted higher on the uterus than the right, and is therefore more tensely stretched. Homburger finds the left ligamentum rotundum usually more distinct and larger than the right, and that the right one is only to be felt rarely when the uterus is rotated to the left. The more tensely stretched left round ligament will thus tend to

increase rotation by pulling the left border of the uterus forwards.

Another cause is one which I believe acts chiefly in the early months of pregnancy, and that is the asymmetry of the bladder when it is distended. The full bladder bulges to the right side; it will thus push back the right border of the uterus, and the loaded rectum will push forward the left border. These latter influences, as I have said, can only act on the pregnant uterus while it is yet a pelvic organ, but at any rate they will help to give it a "set" in the direction I have indicated. When Resident Physician in the Royal Maternity Hospital here, I conducted a series of twenty observations on distended bladders in pregnancy, and found that in every case a flexible bougie introduced into the bladder passed distinctly to the right side, thus proving that the greatest distention of the bladder was in that direction.

Yet another cause of the rotation of the pregnant uterus is one which I consider to be a most potent one, and it is to be looked for in the disposition and arrangement of the middle layer of the muscular fibres of the uterus. I would call this an intrinsic cause of rotation as opposed to the extrinsic causes just considered. These muscular fibres run obliquely in all directions, and it is impossible to conceive that their influence can be equal on both sides. The uterus in this respect may be compared to the heart. The heart is fixed at its base at its junction with the aorta, and at every ventricular systole it rotates on its longitudinal axis to the right, so that the left ventricle comes more forward. The uterus is likewise fixed partly by the ligaments in the pelvic cavity, and partly by its insertion into the vagina. The fundus would correspond to the apex of the heart. As the muscular fibres develop in pregnancy, they in all probability tend to increase the rotation to the right, by being brought into play *actively* in the intermittent uterine contractions which are known to exist all through pregnancy; and *passively*, owing to the stretching which the uterine walls then undergo through the development of the fœtus. To illustrate the effects of distention: take a fresh bladder, fix it below, and distend it moderately with water; we shall find that the bladder rotates on its longitudinal axis, and the greater the distention up to a certain point the more marked will be the rotation. The same thing occurs in the uterus when its walls become distended by the rapid growth of its contents during pregnancy, the oblique muscular fibres being stretched and passively helping to increase the rotation of the organ. I have only assumed so far that the arrangement of the muscular fibres in the uterus is such as to bring this about; but Auvard confirms the truth of my assumption, as he has shown that the development of the uterus is rarely perfectly symmetrical. He has shown, in following the development of the pregnant uterus, that the symmetrical development of the two

halves of the organ produced a uterus which seemed median, while the asymmetrical development seemed to give a right or left inclination, as the case may be. The right development is by far the most common, and any real deviation is simply secondary to that due to greater development.

The anterior surface of the uterus is usually inclined towards the side on which the organ is most developed. In this way the more voluminous horn seems to draw after it the corresponding side of the gestating organ back towards the vertebral column, withdrawing the broad ligament from the same side of the abdominal wall, and acting conversely on the other broad ligament. This explains clearly why rotation becomes more marked during labour and in the early puerperium, the muscular fibres being then in a state of great activity.

The unequal development of different parts of the uterus in pregnancy is further confirmed by Joulin, who says that the increase during the first months is chiefly in the direction of the transverse and antero-posterior diameters, and by Tarnier and Chantreuil, who state that the fundus of the organ increases considerably during the first six months, and the lateral parts follow this increase unequally. The inferior part develops chiefly during the three last months, and is usually more dilated anteriorly than posteriorly, the posterior part of the body being that which develops most in the upper two-thirds.

### *Frequency of Right Lateral Rotation of the Uterus, and its Relation to the Position of the Child.*

Instead of ascribing the rotation of the uterus to the position of the child, as do Schroeder and Stratz, I believe with Lusk, Spiegelberg, and E. Martin, that the position of the child is probably influenced by the rotation of the uterus. Bayer is of opinion that owing to the traction exercised by, and the kind of hypertrophy of, the muscular fibres, the shape and appearance of the uterus are much influenced in the later months of pregnancy by the growth of the fœtus. This can only be so, however, in the later months.

I am far from doubting the accuracy of Schroeder's and Stratz's observations, for I am convinced that they correctly represent the usual state of matters. In their theory as to the production of the rotation, however, they confound cause with effect; for it is not the position of the fœtus in utero which causes the rotation, but it is the rotation which to a great extent influences the position. It is possible that the fœtus during the last month of pregnancy may help by its position to increase the already existing rotation, and so make it more marked. We are able, therefore, to ascertain approximately the frequency of the occurrence of right lateral rotation of the uterus by considering the position of the child,

which is so much influenced by the rotation. We argue from the effect caused to the cause itself. If we allow that the position of the child is caused by the rotation, then the demonstration of the frequency of the occurrence of the position will give the frequency of occurrence of the rotation. When the uterus is rotated on its longitudinal axis to the right, the transverse axis of the uterus lies diagonally in the pelvis in the right oblique diameter. This to a great extent accounts for the fact that in cranial presentations (which constitute fully 95 per cent. of all labours) the vertex of the fœtal head lies, in 99 per cent., in the right oblique diameter of the pelvis. According to Spiegelberg, the back of the child in vertex presentations is directed to the left and forwards in 70 per cent. of cases, and to the right in 30 per cent. When it is directed to the right it is most usually inclined backwards. Although Schroeder and Stratz argue erroneously from their premisses, and confound cause with effect, yet their statistics are sufficiently reliable to be accepted with confidence. They found that out of 120 head presentations which they examined, the uterus was rotated in 117,—in other words, in 97·6 per cent. They do not definitely state whether rotation was right or left, but say that the border of the uterus corresponding to the fœtal back was always turned forwards. Counting only (by general statistics) those cases where the back was forward and to the left, this would give 84 left occipito-anterior positions out of those 120 cases as the very lowest computation,—in other words, Spiegelberg's 70 per cent. But from my own observations I am distinctly of opinion that right lateral rotation of the uterus also occurs in right occipito-posterior positions, though perhaps not quite so constantly as in left occipito-anterior cases. Such being the case, the percentage of cases of right lateral rotation in vertex presentations alone would in all probability be nearer 90 than 70.

Chaignot has carefully investigated thirty cases, with the following results:—

| | | | |
|---|---|---|---|
| 21 were O.L.A. with right rotation | = | 70 | per cent. |
| 1 was O.L.A. with no rotation | = | 3·4 | „ |
| 3 were O.D.P. with right rotation | = | 10 | „ |
| 3 were O.D.P. with left rotation | = | 10 | „ |
| 2 were O.D.P. with no rotation | = | 6·6 | „ |

That is to say, in 80 per cent. there was distinct right rotation, in 10 per cent. there was left rotation, and in 10 per cent. there was no appreciable rotation at all.

There were 22 primary O.L.A. cases = 73·4 per cent.
There were 8 primary O.D.P. cases = 26·6 „

The vertex lay in the right oblique diameter of the pelvis in

every case to begin with; one changed to O.L.P. at the beginning of labour. Chaignot's cases will be more fully considered afterwards.

We are, I think, therefore justified in concluding from the foregoing statements that in vertex cases the uterus is rotated to the right on its longitudinal axis in at least 80 per cent. of cases, probably more. Breech and face cases also present most commonly in the right oblique diameter of the pelvis, and from this circumstance we may in like manner reasonably conclude that the transverse axis of the uterus in the majority of these presentations also occupies the right oblique diameter of the pelvis.

I have on two occasions been able to verify these statements at post-mortem examinations. In both cases the long axis of the vertex was lying in the right oblique diameter of the pelvis, and the fœtal back lay forwards and to the left. Both uteri were distinctly rotated to the right, and their left borders came forward.

Charpentier says that rotation of the uterus to the right always occurs in pregnancy, and agrees with Spiegelberg in stating that the position of the fœtal head, face, and breech depends upon the conformity of the uterus to the pelvis. Tarnier and Chantreuil also coincide in this opinion.

(*c.*) *Position of the Uterus in the Third Stage of Labour and Immediately Post-partum.*—It is to be particularly noted that in examining post-partum uteri in an ordinary post-mortem examination they will be found to have fallen backwards in many cases, owing to the relaxation of the muscles and the emptying of the vessels, in conjunction with the dorsal decubitus of the body; and, as I have already said, frozen sections are liable to fallacy.

Owing to the large size of the uterus and the extreme laxness of the abdominal walls in the early days of the puerperium, its position can usually be satisfactorily ascertained clinically after careful examination.

Schroeder and Stratz, in a frozen section which they made through the body of a woman who had just been delivered, found that the uterus was fully a handbreadth above the umbilicus, and had sunk with the fundus towards the right. They describe the uterus as being twisted with its left border forwards.

*A priori*, we should expect that the post-partum uterus would continue to maintain the same rotation on its longitudinal axis which it had during pregnancy, and this, as a matter of fact, is the case. Rotation is, I think, more marked in the third stage than even immediately post-partum, owing to the strong muscular contraction and retraction; and it is more easily observed, as its shape is not so much modified by its contents as when the fœtus is in utero. Schroeder and Stratz have found that both in the third stage and in the puerperium rotation can be clearly observed.

The puerperal uterus, after complete delivery, usually gives an approximate and diminished representation of the uterus before

delivery, and the puerperal uterus is but an accentuated reproduction of its primitive form.

The fundus of the post-partum uterus seldom lies mesially. It usually inclines to the right side,—(1), because it has a natural lie in that direction; (2), owing to some extent to the influence of the rectum; and (3), from the accident of position. If the bladder be distended, the fundus is thrown to the left. Schroeder and Stratz believe that the fundus uteri generally falls over to the side to which it has drawn itself back over the child's breech,—*i.e.*, "in the first position to the right, in the second position to the left. Also the border corresponding to the child's back is rotated forwards: in the first position it would be the left border, in the second position the right border."

In 150 cases which they observed in the third stage, and immediately post-partum, the uterus only occupied the middle line four times, without rotation on its long axis. One of these cases was after the birth of twins with two large, equally developed children. In the other three the breech went straight out of the uterus forwards. In all the other cases the fundus uteri, after the birth of the child, lay to the right, with that border to the front which had corresponded to the back of the child. Spiegelberg says that immediately after labour the uterus is usually in the median line, but now and then inclines to the right, more rarely to the left side, and, as a rule, is twisted to the right round its axis. When the bladder is full it forces the uterus away from the abdominal wall and straightens it. At the same time it pushes it to one side, and thereby increases its rotation round its longitudinal axis. Spiegelberg inclines to think that the distended bladder usually pushes the uterus to the right, but Croom has shown that it generally pushes it to the left.

Croom has found, from clinical observation, that in many cases the puerperal uterus is rotated round its central axis, so that in fact the transverse axis of the uterus no longer corresponds to the transverse diameter of the pelvis. One side of the uterus is thrown forwards, with the result that its transverse axis corresponds to the oblique diameter of the pelvis. Out of forty cases which he noted, ten showed distinct rotation to the right. His observations were made on uteri which had already begun to involute, and where in all probability the altered state of contraction of the round ligaments, and the commencing degeneration of the muscular fibres of the uterus, had modified their original position.

Börner and Pfannkuch have both investigated the rotation of the puerperal uterus. Börner, out of 64 post-partum cases which he observed, relates that in 50 rotation was entirely absent, in 12 the rotation was to the right, and in 2 to the left. His observations, however, as he himself admits, must not be taken as contradicting the usually accepted ideas. He thinks that after involu-

tion has set in the uterus is too soft and flabby to be acted upon by the forces which formerly influenced it, and any special position it may take up during that time is purely accidental.

Pfannkuch has observed that when the bladder is full, right rotation of the uterus is increased; and Croom has noted that in cases where the rotation was absent or only slight when the bladder was empty, it was well marked when the bladder was distended.

The bladder usually bulges more to the right side in consequence of its asymmetry, and when it becomes distended it encroaches more on the right side, and thus helps to increase the rotation of the uterus. The post-partum uterus is, on account of its size, very easily influenced by bladder distention. The distention of the bladder by no means causes the rotation of the uterus; it simply increases the already existing rotation.

It is often a difficult thing in the third stage of labour, and immediately post-partum, to tell clinically which is the anterior and which is the posterior surface of the uterus, as on account of its then having a somewhat spherical shape there is often not much antero-posterior flattening. When the placenta is situated in the lower zone of the uterus the anterior and posterior walls can often be well felt. In such cases the palpation of the ovaries will be our guide to its position. Their relations to the puerperal uterus we shall immediately consider. The round ligaments can also be felt in most cases. Chaignot says, "The old lateral borders and angles of the uterus are only marked in the puerperal condition by the different parts of the appendages which are fixed to them."

I have myself observed repeatedly marked lateral rotation of the post-partum uterus, and since my attention has been specially directed to the subject, I have, in nearly every confinement which I have attended, been able to assure myself that such rotation existed. I am thus confident, alike from my own experience clinically and from the records of others, that in by far the majority of cases the uterus in the third stage of labour and immediately post-partum lies obliquely in the pelvis with its left edge forwards, and that this state of matters is much more common at both these times than in any other circumstances. I have often observed right lateral rotation of the uterus in the third stage where rotation could not be definitely made out during labour, and my experience is that right rotation occurs in the third stage just as frequently after right occipito-posterior (O.D.P.) as after left occipito-anterior (O.L.A.) cases.

Where the abdominal walls are very thick it is difficult to satisfy oneself exactly as to the position of the uterus, and it has chiefly been in such circumstances that I could not make sure as regards the existence of rotation.

There is no doubt, then, that although in the non-pregnant condition there is a certain amount of rotation of the uterus, yet that this rotation is greatly increased during pregnancy, especially in the

later months, and persists during the early days of the post-partum period.

The uterus is rotated to the right in probably between 80 and 90 per cent. of cases, and one may practically assume that when the fœtal vertex, face, or breech present in the right oblique diameter of the pelvis, the uterus will at the same time be rotated to the right. The one condition may be regarded as almost the corollary of the other, as the rotation of the uterus greatly determines the position of the presenting part.

## II. The Ovaries, and their Relation to the Uterus before and during Pregnancy.

Each ovary in the unimpregnated condition is situated at the entrance to the true pelvis, about two centimeters from the corresponding horn of the uterus. Hasse describes the long axis of the ovary as lying transversely in the pelvic cavity, with slight obliquity, the opposite organs diverging anteriorly. Schultze has asserted that the long axis of the ovary lies antero-posteriorly in the pelvis. His, from his more recent investigations, believes the truth to lie between these statements. He never found the uterus symmetrically in the middle line. When the uterus inclined to the right, the right ovary lay with its long axis completely vertical, and with one side closely applied to the outer bony wall of the pelvis; but the left ovary, being dragged upon by the uterus, lay obliquely in the pelvis.

From these observations His deduces that uterine rotation will still further exaggerate these respective changes in the ovaries, and that as a consequence to changes in position of the uterus displacements of the ovaries ensue.

Rouget and Krause have observed that in consequence of the asymmetry of the uterus, the right ovary is on a plane a little posterior to the left ovary, which latter is in front and on a higher level. They describe the left ovary as lying close to the abdominal wall, through which it may be compressed in the middle of a line which would stretch from the anterior and superior iliac spine to the symphysis pubis. Posteriorly, according to them, the right ovary is separated from the sacro-iliac articulation by a space of about two centimeters.

Portal has also recorded a difference in height between the two ovaries—the left being on a higher level than the right. This may be the case before pregnancy, but in my experience this only holds good during pregnancy or post-partum, when the uterus is very much lateriverted to the right, so as to tilt up the left ovary. When the uterus is replaced in the middle line the right ovary is usually at a higher level than the left.

Kölliker believes that there is a great physiological variation in the position of the ovaries, but, according to Olshausen, the only

change of importance which the ovary undergoes physiologically is its ascent during pregnancy. He says, "In advanced pregnancy one or both ovaries (generally the left) are often felt high up above the pelvis, and in close apposition to the uterus. This is also true of the puerperal period, but the ovaries resume their original position about the twentieth day after confinement."

Rouget well says, *à propos* of the rotation of the uterus, "The effect of this rotation is to alter the position of the ovaries. In pregnancy, owing to the shortening and splitting up of the broad ligaments, the ovaries are in much closer contact with the uterus than in the unimpregnated condition. They rise up into the abdominal cavity as the uterus enlarges, and immediately after labour are on a level with the brim of the pelvis."

There are two important points to be noted about the position of the ovaries in pregnancy,—firstly, that post-partum their distance below the fundus uteri is not nearly so great as in the full-time gravid uterus. After labour the ovaries bear much the same relation to the uterus, so far as distance below the fundus goes, as in the non-pregnant state. The ovaries in a full-time pregnancy, according to Chaignot, are at the middle or at least the superior third of the uterus. Secondly, the ovaries lie in close contact with the lateral walls of the uterus, owing to the shortening and splitting up of the broad ligaments. Their mobility is consequently greatly diminished, but has not entirely disappeared. Charpentier finds that they become vertical, and almost touch the uterus.

Tarnier, Budin, Auvard, and E. Martin, in speaking of the Cæsarean operation, all mention as a danger to be remembered, that the left ovary, owing to the rotation of the uterus, may be found lying under the median incision. Martin says this is most apt to occur in lordosis, and he cautions the operator against accidentally injuring the left appendages, and so giving rise to troublesome hæmorrhage. Tarnier and Budin record cases in which this has happened.

Freund has likewise observed that in consequence of rotation, the left border of the uterus with the annexa approximated more closely to the abdominal wall.

In Winter's frozen section, which I have already referred to as an example of right lateral rotation of the uterus, he describes the position of the appendages thus:—"The conjunction of the left tube is completely to be seen in front. It is 21 centimeters above the upper edge of the symphysis. From this the tube runs straight down in front of the ovary, and surrounds it below and behind. The ovary lies close to the side edge of the uterus, four fingers' breadths above the symphysis. The right ovary lies somewhat higher, hidden behind the uterus. The right tube is invisible in its upper course, and appears first beneath the ovary. The left round ligament runs considerably nearer the median line than the right."

Schroeder and Stratz likewise confirm, from their own observations, the fact that as a consequence of the rotation of the uterus the ovaries follow its movements, and so one lies more anteriorly and the other more posteriorly. They have also observed that in consequence of the anteflexion of the puerperal uterus, and the relaxation of its appendages, the ovaries fall forward over the tubes.

*Condition of the Ovaries during Pregnancy.*—There can be no doubt but that the ovaries increase in size during pregnancy. Murat, Velpeau, and Chereau say they are softer and more voluminous; Courty, Joulin, and Cazeaux say they are notably augmented; while Stoltz, Jacquemier, Tarnier, and Chantreuil say they are doubled in size. The ovary which contains the corpus luteum is always the bigger of the two.

*Nervous Supply of the Ovaries.*—The uterus and ovaries have a very rich nerve supply. The nerves are derived from four sources:—(1), The spermatic; (2), the hypogastric; (3), the conjoined hypogastric and sacral; and (4), the internal pudendal.

The ovarian plexus is an appendage of the renal plexus, and accompanies the ovarian artery; at the level of the hilum its branches penetrate with the vessels into the interior of the gland, and ramify themselves in the cortical zone. Gaskell finds that cerebrospinal nerves pass to the hypogastric plexus, and thence to the uterus and ovaries by visceral branches of the 2nd and 3rd sacral nerves, which form part of the pelvic splanchnics, and are known as the *nervi erigentes.* The sympathetic fibres, on the other hand, pass to the inferior mesenteric ganglion along the *rami efferentes* of that ganglion, and thence to the hypogastric plexus.

Elischer finds that the nerves of the ovary enter into its substance in the form of medullated fibres, accompanying the looped and tortuous vessels that pass to the hilum, and run also in the proper ligament of the ovary.

Frankenhäuser and Jastreboff have shown that the nerves and ganglia of the uterus and ovaries increase in number and size during pregnancy.

Braxton Hicks, after remarking how intimately the uterus and ovaries are connected with the sympathetic nervous system, and how they are almost entirely supplied by ganglionic nerves, goes on to say that the nervous structures and ganglia grow and increase in pregnancy; that the susceptibility of the uterus is increased, and its reflex phenomena more marked.

*Vascularity of the Ovaries during Pregnancy.*—Velpeau says that during pregnancy the bloodvessels of the ovary dilate, sometimes to the point of rupture. Roux, Murat, and Chéreau say that there is a spongy state of the organs in pregnancy, due to the augmentation of calibre of their vessels, which bring blood to them in greater abundance. Chéreau and Hervieux rely on this physiological congestion to explain the frequency of puerperal ovaritis. Churchill and Stoltz also believe that there is increased blood-supply.

Bischoff and some others have denied this engorgement of the ovarian vessels in pregnancy.

It seems to me, however, that all the evidence is in favour of increased blood-supply during gestation. The ovaries are supplied from the same arterial trunks as the uterus, and if there be not active congestion, there will be at least passive congestion, as may be seen in the rectum, vulva, and lower limbs.

Devalz and Richet have described varicose dilatations of the bulb of the ovary in the broad ligament during pregnancy, which from excessive distention have even ruptured, causing a variety of peri-uterine hæmatocele. They believe this ovarian varicocele to be the result of the frequently repeated congestion at the menstrual epochs.

*Sensitiveness of the Ovaries during Pregnancy.*—Loumaigne and Puech deny the sensitiveness of the ovary in the normal state. They base their assertions on cases of hernia of the ovary. In their cases, however, the ovaries had become atrophied, and consequently were not tender to touch.

Guersant and De Coste have observed cases of ovarian hernia in which "the sensation of pain on pressure was similar to that of a testicle" (Chaignot).

Percival Pott's well-known case of double ovarian hernia shows that in a healthy woman the ovaries were exceedingly tender on the least pressure.

Hegar and Kaltenbach also show this, and Murat likewise adduces instances of the tenderness of healthy ovaries.

Puech thinks that the ovaries are only tender in what he calls abnormal conditions, as when they are congested in menstruation.

Professor Courty of Montpellier writes as follows:—"La *sensibilité normale* de l'ovaire est exquise (elle n'a pu être niée que par des médecins inexpérimentés); sa sensibilité pathologique est développée à un tel point que la moindre pression y provoque des douleurs atroces."

There can be no doubt that congestion, whether active or passive, will make the ovaries more sensitive to external pressure, and pregnancy certainly fulfils this condition.

After thus considering the position of the uterus and ovaries in pregnancy, one is impressed with the fact that in consequence of the uterine rotation so commonly to be observed, one of the ovaries (usually the left) is brought close under the abdominal wall, and consequently might possibly be injured by pressure through the abdominal wall. There can be no doubt that the ovaries during pregnancy are very sensitive, and pressure upon them causes pain which is sometimes very severe.

Budin has recorded some very interesting cases which prove this. He has noticed that in palpating the abdomen in pregnancy he has sometimes found moderate pressure with the fingers on the abdomen produce very sharp pain. The pain was clearly localized;

was distinctly produced by the pressure of the fingers on one spot, and caused the patients to groan or cry out. Pressure on the neighbouring parts was not in the least painful. At the spot where the pain was felt, a small body moved below the finger, being movable transversely but not perpendicularly. Its form was oval, its great axis usually vertical, but sometimes oblique from above downwards and from within outwards, and its size was generally about that of an olive. This Budin believes to be the ovary. It is nearly always to be found on the left side near a line drawn from the umbilicus to the anterior superior spine of the ilium. A resisting surface, generally the fœtal back, allows the pain to be more readily provoked and the movable body more easily to be found. Budin goes on to say that the ovary is to be felt to the left and forwards on account of the rotation of the uterus during pregnancy, which brings its left border forwards, and by the fœtal back being to that side. He does not say how many cases he had investigated, but that "in only two of the many cases" which he has observed was the right ovary to be felt to the right side and forwards, and in these cases the fœtal back was also forwards and to the right.

If the uterus contract, it is easy to produce by pressure a sharp localized pain, and to feel the ovary rolling beneath the fingers. When contraction ceases, this is often more difficult. The round ligament may be felt rolling under the finger, but it is painless on pressure, and is not oval in shape, but more like a cord. None of Budin's cases were hysterical.

Budin proved that this tender oval body as described was really the ovary in a case in which he had palpated it previous to a Porro's operation. Both Tarnier and he found before the operation the ovary lying to the left and towards the middle line of the abdomen; it rolled under the finger, and was painful when pressed. When the abdomen was opened the first part of the uterus which presented itself was the left border with the ovary adhering, and they proved that it was it which they had previously felt through the abdominal wall.

Chaignot, in less than three months, made thirty consecutive clinical investigations on hospital patients, and found that abdominal palpation employed at the end of pregnancy may produce on the sides of the uterus in a certain number of women a sudden and sometimes very sharp pain. He has identified this pain with pressure on the ovary, and he finds that it is most easily produced when the ovary lies on a resisting surface, such as the back of the fœtus or the contracting uterus. "The pain is felt most frequently to the left, owing to the torsion of the uterus bringing forward its left lateral edge."

Its usual position, according to Chaignot, is near a line drawn from the anterior superior spine to the umbilicus, usually a few centimeters above it in the last month of gestation. The average

distances are as follow:—8 to 10 centimeters from the anterior superior spine; 17 to 19 centimeters from the umbilicus; 6 centimeters behind the prominence formed by the round ligament.

| | Left Side. | Right Side. |
|---|---|---|
| | Centimeters. | Centimeters. |
| Distance from anterior superior iliac spine, . . . . | 9 to 10 | 7 to 8 |
| Distance from umbilicus, . . | 17 to 19 | 18 to 20 |
| Distance from round ligament, . | 5 to 6 | 5 to 6 |

I have made a short abstract of Chaignot's cases, which I here append:—

23 *Cases—Ovary felt on Left Side.*—17 were O.L.A. throughout. 3 were O.L.A. with left ovarian pain to begin with. One changed to O.D.P., and the left ovarian pain changed to right ovarian pain. One changed to O.L.P., and the pain on pressure disappeared, and the ovary likewise ceased to be felt. One changed to O.D.P., and the ovarian pain, though still in the same place, was not nearly so sharp. 3 were O.D.P. throughout.

3 *Cases—Ovary felt on Right Side.*—3 were O.D.P. throughout.

4 *Cases—Ovary felt on Both Sides.*—2 were O.L.A. One was a hysterical patient; the fœtus was very large, the uterus was inclined to the right, but there was no rotation. The other showed right lateral inclination and slight right rotation The right ovary could only be felt during a pain, as it was further back. 2 were O.D.P. There was no rotation in either case. In one there was no lateral inclination.

*Analysis of Chaignot's Cases.*

The vertex of the fœtal head lay with its long diameter in the right oblique diameter of the pelvis in every case to begin with (one changed to O.L.P. afterwards):—

| | | |
|---|---|---|
| 22 primary O.L.A. in 30 cases | = 73·4 | per cent. |
| 8 primary O.D.P. in 30 cases | = 26·6 | " |
| 23 cases had left ovarian pain | = 76·7 | " |
| 3 cases had right ovarian pain | = 10 | " |
| 4 cases had double ovarian pain | = 13·3 | " |

Chaignot believes that the reason why, in right occipito-posterior cases, the anterior ovary cannot well be felt to the left is because there is no resisting fœtal back to press it against. He believes that "the size of the fœtus, multiple pregnancy, nervous and irritable temperament, and hysteria, are among the conditions

which favour the appearance of ovarian pain, and especially its intensity."

Chaignot has likewise sought for the ovaries post-partum within eight or ten days, but he has never been able to make them out definitely except once,—"as the hard resisting plane of the uterus is then wanting, and it would require very deep palpation." He has provoked ovarian pain by pressure during the puerperium, which was always felt several centimeters below a line drawn from the anterior superior spine to the umbilicus; and the less recent the delivery, and the more retracted the uterus, the deeper the pain is. When he found ovarian pain after delivery, it was generally during the first days. The furthest period at which he could produce it was the eighth or ninth day. His conclusion is, that the ovarian pain produced by pressure during pregnancy can be reproduced after delivery.

Féré records two cases of pregnancy and labour in hysterical women who were delivered in a state of trance. In both cases he could palpate the ovaries, which were very tender on pressure. He watched the tender spots ascend with the uterus during pregnancy, and descend with it after labour. The left ovary was the one best felt, and there was ovarian pain on pressure post-partum.

Charcot has noted that in hysterical women, although the microscope has not yet discovered any special anatomical lesion, the ovaries are the seat of a swelling which renders them more accessible to exploration.

I have myself been able repeatedly to palpate the ovaries during pregnancy, and in every case even moderate pressure elicited pain.

The palpation of the ovaries, which we have hitherto been considering, has, however, been comparatively gentle; and in many cases the ovaries were the objects for which the palpation was made, all pressure immediately being removed as soon as ovarian pain was elicited.

The uterus in the third stage of labour is, however, often subjected to a much more severe form of palpation, a palpation which is necessary either for the purpose of stimulating it to contract firmly, or for hastening the expulsion of the placenta from its cavity. In many cases this palpation, or rather compression, requires to be very energetic and prolonged; and I am of opinion that this compression, which is only intended for the uterus, includes sometimes one or both ovaries as well, and that they in consequence may be injured in the third stage of labour by forcible compression against the contracted uterus.

(1.) In the third stage of labour the ovaries, as we have seen, lie close to the fundus uteri, and so the hand grasping the fundus could easily grasp the ovaries at the same time. The conditions are different to what they were before the expulsion of the fœtus, for then the fundus is far distant from the ovaries, and firm

pressure can be made upon it (as is sometimes done in *expressio fœtûs*) without fear of including the annexa.

(2.) The pressure is often pretty vigorous in the third stage.

(3.) The rotation of the uterus, causing in the majority of cases the left ovary to come forwards towards the middle line, makes the ovary more liable to be grasped.

(4.) The ovaries in the third stage are lying just at the brim of the pelvis, and the left ovary is apt to be squeezed or pinched between the bony pelvis and the hard contracted uterus if forcible pressure downwards be made in an awkward application of Credé's method.

In a previous paper I have already detailed three cases which came under my notice in practice, in which intense pain was experienced during the compression of the uterus in the third stage, followed by a further development of remarkable nervous phenomena, terminating in well-marked shock, in which I ascribed the condition to pressure on the ovaries. From that paper I quote the following paragraph:—

"I have repeatedly seen an analogy to this occur in cases of abdominal section for the removal of the ovaries and Fallopian tubes. If, as sometimes happens (especially in cases of fibroid tumour with healthy ovaries, or where diseased appendages are not easily brought to the surface), the ovaries should be somewhat roughly handled or accidentally torn, say by a pair of forceps, before the ligature has been tied, it is a matter of common observation that the patient, though fully anæsthetized, in the majority of cases becomes affected by modified shock. The pupils dilate, the face becomes deathly pallid, the extremities cold, a clammy perspiration breaks out, the pulse flutters, and the respirations become shallow and irregular. These symptoms pass off when the ligature is tightened and the organ removed. If such a condition happens when atrophied, cystic, or even cirrhotic ovaries are irritated, how much more is it likely to occur when the large, congested, tender ovaries of pregnancy are forcibly compressed against the hard post-partum uterus, and when the patient is either not under the influence of an anæsthetic or is only partially anæsthetized."

The following are three cases in detail to illustrate this:—

(1.) I. B., æt. 26, suffered from double salpingo-oöphoritis. Abdominal section was performed in the Royal Infirmary on 19th May 1886, and both ovaries and tubes were removed. The appendages on the left side were adherent and difficult to reach. When brought to the surface the pedicle was very short. The ovary was seized by a pair of Spencer Wells' forceps to hold it up while the ligature was applied. Immediately the patient's breathing became affected, the pulse fluttered, the face changed in colour, becoming bluish white, and a cold perspiration broke out. The patient was all the time fully, but not too deeply, anæsthetized,

and her condition became quite satisfactory after the ovary was removed.

(2.) Mrs T., æt. 31, suffered from double salpingo-oöphoritis with extensive adhesions. Abdominal section was performed in the Royal Infirmary on 2nd June 1886. Great difficulty was experienced in getting the appendages of the right side to the surface, and eventually only the tube was got away. The ovary and tube on the left side were both removed easily. The left ovary was grasped by a pair of forceps before the ligature was tied. The patient, who was breathing quietly and steadily at the time under the influence of ether, and with a good colour in her face, suddenly gasped, became deathly pale, retched violently, and manifested all the symptoms of shock. On the removal of the ovary she quickly recovered, and her condition remained satisfactory till the end of the operation, from which she made a good recovery.

(3.) Mrs W., æt. 36, suffering from a bleeding fibroid tumour of the uterus, reaching one finger's-breadth above the umbilicus. The sound passed 5 inches into the uterus. The ovaries and tubes were removed on 4th April 1887 in Ward XXVIII., Royal Infirmary. The ovaries were found practically sessile on the uterus, owing to the shortening and splitting up of the broad ligaments by the fibroid growth. Ordinary ligatures could not be applied; the clamp and cautery were used. Each time the clamp was applied the patient manifested symptoms of transient shock, similar to those already described. The clamp included a small portion of each ovary in its grasp, and very soon after it was thoroughly tightened the symptoms disappeared.

Curiously enough, the fibroid uterus in this case was rotated so that the left ovary lay almost immediately under the incision. The tumour had to be considerably rotated round to the left before the right ovary could be reached.

Amand Routh has found that "dilatation of the cervix by bougies, tightening the serre-nœud in hysterectomy, tying the pedicle in ovariotomy, sponging out Douglas' pouch, or freeing matted ovaries and tubes from their adhesions, are all similar in being liable to produce shock, intermission or omission for two or three beats of the pulse, and temporary cessation of respiration. Vomiting is also apt to be set up by rapid dilatation. All these phenomena are lessened by deep anæsthesia, which usually allows the operation to be proceeded with. In one case the operation had to be discontinued."

We can further find a similar analogy to this in the case of the testicles. Both the ovaries and the testicles are richly supplied with nerves, derived in each case from the great sympathetic system.

Valentin has clearly established the homology of these organs. He says:—"The first origin of the ovary and testicle is entirely analogous, and both develop in the same way for some time, until

the period when a different character indicates itself, when the continuation of the development of a tubular gland ceases in the ovary, and the characteristics of its first structure become more and more difficult to distinguish."

Instances of shock occurring after injury to the testicle are very numerous.

Pirogoff speaks of a judicial case where death by shock speedily followed upon intentional crushing of both testicles. The section showed only extravasated blood in the tunica dartos and under the albuginea.

Erichsen has observed during castration, at the moment of cutting through the spermatic cords, a sinking of the pulse, even when the patient was completely anæsthetized, so that it seemed better to stop using chloroform at the moment.

Fischer has observed shock resulting from the too tight strapping of inflamed testicles.

Vincent records a case of passing shock after a kick on the testicle, and Hosteing a similar case after crushing of the testicle on the saddle.

Pelikan has shown that bruises of the testicle or spermatic cord are more apt to produce shock than clean wounds.

Hunter saw a sudden death during castration, and dangerous convulsions during an operation for hydrocele.

Why, then, should not shock occur just as well after bruising of the ovary as it does after bruising of the testicle?

Any strong irritation of the peripheral sensitive nerves, or of the sympathetic nerves, is capable of engendering a condition of exhaustion of the spinal cord, which manifests itself in weakening of motility, sensibility, and reflex power, and in a depressing influence on the heart and respiration.

Shock is a functional disturbance, and has no real pathological anatomy, though after death there is sometimes to be found enormous distention of the abdominal bloodvessels, supposed to be due to paralysis of the splanchnic nerves.

The theories as to the production of shock are endless. Irritation of the vagus, simple paralysis of the heart, or reflex, partial, or general vascular paralysis, cannot wholly account for it. The attempts to explain it by saying that it is due to contraction of the small arteries, or to changes in the composition of the blood, have not been proved. In short, the vascular apparatus and its contents give no satisfactory explanation of shock. The only satisfactory hypothesis, according to Groeningen, is "that which occupies itself with the whole sphere in which the appearances we have considered originate." The most feasible explanation is that shock is an exhaustion of the medulla and of the spinal cord, caused by violent injuries. The irritations which influence sensitive nerves can be classified, according to the resulting excitement, into four stages (Groeningen):—

(*a.*) The lowest stage is ineffectual. The excitement does not go beyond the threshold of consciousness, and evokes no other appreciable effect.

(*b.*) The middle stage destroys (auslösen) the proportionate feeling.

(*c.*) The strong stage effaces the fineness in the feeling of quality, and permits the feeling of pain, or one akin to it, to come into the foreground.

(*d.*) The highest destroys every feeling, fugitive or lasting.

The lower stage of irritation, applied with or immediately after a higher one, remains without effect; or, as Fourneaux Jordan well puts it, "Shock is to a certain extent a protection against shock."

Every excitement of a nerve calls forth in itself, as well as in the central organs, a change tending to fatigue; the collective appearances of reflex stoppage, and of reflex paralyses, are thus explained in a satisfactory way.

Brown-Séquard believes that iritations of nerves may produce three kinds of shock:—

1. Shock where reflex arrest or diminution of the heart's action predominates.

2. Shock where there is a peculiar inhibitory influence on the central organs of respiration, the heart continuing to beat with more or less vigour.

3. Where a powerful influence is exerted by the nervous centres on the nerves able to act on circulation, secretion, and nutrition, so as to produce a cessation of most, if not all, the ordinary interchanges between blood and tissues. In this third form of collapse the bloodvessels are generally contracted; there is always a diminution of breathing, and a weak, sometimes slow, pulse.

Watson lays special stress on the fact that shock is determined in intra-peritoneal operations from reflex action by irritation of the sympathetic.

Kaltenbach considers reflex paralysis of the heart to be the essence of shock in abdominal operations. He goes on to say that in the milder cases the symptoms of shock subside as soon as the cause is removed,—for example, after the cessation of extensive manipulation of the intestines. In some cases, however, the patients die during the operation, or within three or four hours afterwards.

The splanchnic is the vasomotor nerve of the intestinal bloodvessels, so that it governs the largest muscular area of the body; it is likewise the sensory nerve of the intestine, and under certain circumstances it may give rise to very painful sensations. According to Landois and Stirling, the trigeminus and splanchnic nerves are the most sensitive to pain in the whole body.

Fourneaux Jordan, in his classical essay on shock, says, "The peculiar condition which more than any other influences shock is the susceptibility or excitability of the nervous system."

Injuries of the abdominal viscera are always marked by extreme and severe shock. This is to be explained by the impression made upon the cerebro-spinal system through the medium of the ganglionic. Women are probably more influenced by reflex irritations than men, and are liable to a severer form of shock.

*Conditions which may simulate Post-partum Shock.*

(1.) *Syncope from Hæmorrhage.*—There is no doubt that not only are syncope and shock often associated with one another, but also that the manifestations of shock are frequently intensified by the co-existence of hæmorrhage, which may or may not have gone so far as to produce syncope. At the same time the two conditions are quite separate and distinct, and in the majority of cases are easily distinguished from one another. There has been and still is a great deal of confusion on the subject; some writers under the title of "Collapse" including both conditions, and others drawing hardly any distinction between them. This confusion is mainly due, I think, to the many pathological theories which have been advanced regarding the nature of shock, most of which were erroneous, and calculated to mislead the clinical observer. I feel sure that the two conditions are frequently confounded, and that many cases of shock after labour are erroneously described as arising from the effects of hæmorrhage. I shall have occasion again, however, to refer to this point.

Nothnagel has very clearly pointed out the differences between syncope and shock, and I cannot do better than quote some remarks he makes with regard to their differential diagnosis. He says:—"After successful delivery, profuse hæmorrhage occurs on account of faulty contraction of the uterus. If energetic measures be not taken at once, all the symptoms of fainting appear, and there accompany them, with or after fainting, the strongest general convulsions, very like epileptic. The symptoms are oppression, sighing and rapid respiration, yawning, paleness of the face, increase of oppression with giddiness, feeling of general torpidity, cold perspiration, singing in the ears, sickness, and inclination to vomit; the sight is darkened, and the surrounding voices cannot be heard. The pulse is regular, but small and of low tension, and there is quick recovery as a rule.

"Shock is quite different from this. In pure shock there is no singing in the ears, no oppression, no giddiness, no darkening of the sight. There is irregular, weak, and rapid pulse, and irregular breathing. There is no twitching of the muscles, no epileptic convulsions, not such a marked loss of consciousness, and no quick recovery."

In the torpid form of shock the senses and consciousness are benumbed, the eyes are dull, vacant, and motionless, with dilated pupils, and there is subnormal temperature. The patient at first

complains of coldness and numbness of the limbs, and often the sphincters are relaxed, and there may be a tendency to nausea and vomiting. Shock usually produces a degree of syncope as well. In my cases the complete unconsciousness was undoubtedly due to syncope which was superadded to the shock. In all cases careful investigation must be made as to the existence of hæmorrhage, concealed or otherwise.

(2.) Shock has also to be distinguished from the effects of an overdose of ergot or ergotin. I have once seen such a condition, where undoubtedly more ergotin had been administered to a patient than was either necessary or safe. The patient complained of giddiness and loss of sensation, and the respirations were shallow and slow. There had been hardly any hæmorrhage in the third stage, but the uterus was flabby, and the ergotin had been given mainly from a prophylactic point of view. These symptoms soon passed off after free stimulation. The pulse was not affected. Lauder Brunton has found that a solution of Bonjean's ergotin injected into animals causes an affection of the nervous system indicated by inco-ordination, anæsthesia, and paralysis, and death is due to paralysis of respiration. The muscles are unaffected, and the motor nerves are not paralysed. The sensory nerves and spinal cord are paralysed. Ergot acts directly on the inhibitory apparatus in the heart itself, and tends to slow it and ultimately to stop it in diastole. There is usually a rise of blood-pressure at first from its stimulating action on the vasomotor centre in the medulla, and owing to the firm contraction of the intestines and uterus rendering them devoid of blood, an extra quantity of blood is thrown into the rest of the circulation.

(3.) The uræmic coma, so often seen in puerperal eclampsia, is easily diagnosed from shock by the history of the convulsions, the nature of the pulse, and the state of the urine.

(4.) Pulmonary emboli from venous thrombosis are the commonest cause of collapse and sudden death in the post-partum state, and might be mistaken for severe shock. Sudden dyspnœa and orthopnœa usually indicate this condition. Wernich has recently stated that in his opinion so-called shock is often due to small emboli.

(5.) The entrance of air into the veins immediately after delivery causes symptoms very similar to pulmonary embolism. Asphyxia and collapse usher in death.

(6.) Collapse and possible sudden death may occur after labour as a result of pre-existing disease which has been aggravated by the labour. For example, I have seen two cases where collapse and death followed soon after labour in patients who were suffering from mitral stenosis, and Barnes records a case of sudden insensibility followed by death, where post-mortem a hæmorrhage was found to have taken place in the left optic thalamus.

(7.) Collapse or sudden death may likewise occur post-partum

from totally accidental causes, as, for instance, in a case of Simpson's quoted by Auvard, where death rapidly followed the rupture into the peritoneal cavity of a large hepatic abscess.

Hysteria and epilepsy must also be kept in mind as possible causes of insensibility after labour.

*Prevention of the Form of Post-partum Shock which we have been Considering.*

Clearly the way to prevent the occurrence of the shock is to avoid bruising the ovaries in the management of the third stage. I have been unable to find any description of such a danger as this in the application of Credé's method. The only authors who mention anything about pain in the third stage are Riol and Spiegelberg. The former says, in speaking of expression of the placenta,—"The most serious of the inconveniences of this proceeding is certainly the pain produced—a pain which is sometimes not considerable, but which sometimes becomes tolerably acute if expression be practised for a long time, and which obliges the accoucheur to have recourse to another method of deliverance. When the uterus is soft and flabby pain is often produced by long compression, which is so sharp that the patient can no longer bear the action of the hand. Where a great deal of vigour is necessary to expel the placenta the pain is sometimes so great that one must cease to express. There are some women also, timid or nervous, sensitive and delicate, who cannot bear the action of the hand on their abdominal walls, and this pressure, even when slight, causes sharp pain, and sometimes even cries, which necessitate the employment of another means. I have, however, seen women who could not bear the manœuvres of expression to begin with, and who after a few minutes' rest permitted a second and a third attempt, which were always followed by success. Other women, it must be said, prefer uterine expression to any other means of deliverance."

Neither Riol, however, nor any other writer say a word of the ovary in connexion with the pain.

How can we make certain of not including one or both ovaries in our grasp of the uterus during the third stage? Clearly by grasping the uterus antero-posteriorly, and avoiding its lateral borders. Now, in all the descriptions of Credé's method[1] this point is not made perfectly clear. It is implied, perhaps, but it is not stated. The directions given have all a reference to landmarks in the pelvis, not to the position of the uterus. We are told in effect, by all, to pass the ulnar side of the hand down in front of the promontory, the entire hollow of the hand lying on the fundus,

[1] When I speak of "Credé's method" in this paper, I only mean his method of grasping the uterus, which is the type of the universally accepted "Handgriff."

and the thumb on the anterior uterine wall behind the symphysis pubis (Spiegelberg, Playfair, Lusk, Charpentier, Grandin, etc.)

Credé and Mundé figure the hand grasping the uterus with the thumb behind the symphysis pubis, and the fingers in front of the promontory of the sacrum. Now, I contend that if the compressing hand be in this position the uterus is not, as a rule, grasped antero-posteriorly, and that the ovaries are consequently in imminent danger. In other words (as we have already seen), *that the term antero-posterior* quâ *the pelvis is not antero-posterior* quâ *the uterus in the great majority of cases.*

To avoid the danger of touching the ovaries, and to make sure of grasping the uterus antero-posteriorly, the hand should be passed into the brim of the pelvis obliquely, and as we can infer that in at least 90 per cent. of cases the uterus is rotated to the right, the ulnar side of the hand should be pressed deeply down in the direction of the left sacro-iliac synchondrosis, while the thumb should be behind the right ilio-pectineal eminence, the fundus of the uterus resting in the hollow of the palm.

In the vast majority of cases such a grasp of the uterus will entirely avoid the ovaries, and firm compression can safely be made without causing the patient much pain or inconvenience.

The reasons why the ovaries are not more frequently injured in the management of the third stage of labour are:—

(1.) The uterus has usually been grasped obliquely as above described, though the fact has not hitherto been recognised, and has escaped observation. When a patient is lying on her left side in the usual obstetric position, it will be found that the operator's left hand involuntarily grasps the uterus in an oblique direction *quâ* the pelvis, and that the attempt to grasp it in an antero-posterior direction *quâ* the pelvis involves a twisted and constrained position of the hand which it would be impossible to keep up for any length of time, and would absolutely prevent the bringing into play of any degree of muscular force. Any accoucheur can prove this for himself in his daily experience. From this it will be observed that when the patient is lying on her left side especially, the accoucheur naturally grasps the uterus obliquely *quâ* the pelvis, and consequently antero-posteriorly as regards itself, so that the ovaries usually escape danger. Even when the patient is lying upon her back it will be found that the hand naturally sinks into the pelvis obliquely in the same way. The common practice, then, in the application of Credé's method, seems to be that the hand is not antero-posterior *quâ* the pelvis, but that it is antero-posterior *quâ* the uterus. In other words, that the safe grip of the uterus which I advocate is the one usually employed, and that the ovaries have hitherto escaped compression more by good chance than by good guidance.

It is just possible that in consequence of this fortuitous circumstance injuries to the ovaries are more apt to take place when the

uterus is either not rotated at all, or where there is rotation to the left.

(2.) Not infrequently, in grasping the uterus in the third stage, even a very slight pressure provokes pain, in all probability ovarian in its nature. The accoucheur in such a case naturally changes his grip, and usually the alteration in the position of the hand relieves the patient from pain, and enables firm compression to be made with little or no discomfort. This sufficiently accounts for Riol's observation quoted above.

The ovary also, owing to its lateral mobility, may slip away from beneath the compressing fingers, and thus escape injury or be but slightly irritated.

In palpating the abdomen in pregnancy the ovary is often to be felt slipping away, as it were, under the fingers.

(3.) If the anterior and posterior surfaces of the uterus are well marked and easily felt, the accoucheur naturally grasps it antero-posteriorly, and alters its position to suit his hand. Sometimes the ovaries can be felt, and thus one is enabled to avoid them.

(4.) It must be remembered that in many cases the employment of the hand through the abdominal wall is simply a precautionary measure for the purpose of detecting and preventing relaxation of the uterus. In these circumstances no great pressure is requisite, and the ovaries, even though touched, are consequently not endangered by too great pressure. Spiegelberg mentions that when compression of the uterus requires to be forcibly done it is often very painful. This, however, does not require to be done very frequently, he remarks, if the third stage be managed properly, and time is given for the natural separation of the placenta to be effected.

Possible injuries to the ovaries during the compression of the third stage must not, however, be left to the determining influence of practically accidental circumstances, but the accoucheur should have a clear idea that if he grasp the uterus in a certain way he will, as far as it is possible to do so, avoid coming in contact with the ovaries. He will, I think, succeed in doing this in most cases by practising the oblique grasp which I have described.

In this connexion I again quote two paragraphs from my previous paper on post-partum shock. If a patient should complain of severe pain during the manipulation of the post-partum uterus, one should always fear that the ovaries are being compressed at the same time. It depends on the temperament of the patient to a great extent, as well as on the amount of bruising to which the ovaries are subjected, whether the symptoms produced by compression of the ovaries will be severe or not. True, it is not often that such alarming reflex symptoms occur as were observed in the three cases which I have recorded, yet there can be no doubt that the ovaries should, as far as possible, be guarded from all sources of irritation, and that every care should be taken

to prevent their being injured during the third stage of labour, and immediately post-partum. The injury inflicted on the ovary may not be, and seldom is, so great as to produce shock, but may it not (and I merely throw out this as a suggestion) account perhaps in some measure for some of the low forms of inflammation and other pathological conditions so frequently met with in the ovaries as a result of the puerperal state.

The ovaries undoubtedly run greater risk of being injured in the hands of those who "Credé" the ovaries on no special principle, without regard to the axis of the pelvis, and who are only too glad to get the placenta squeezed out in any way, often immediately after the end of the second stage. But it will be said no such cases have been recorded.

One, however, occasionally reads and hears of cases where so-called syncope has come on in the third stage or immediately thereafter. The uterus had been a little relaxed, and there had possibly been a slight threatening of hæmorrhage. The syncope is ascribed to the trifling loss of blood, often not in excess of what one would expect in a normal labour, instead of being put down, as I think in many cases it should be, to the energetic and forcible kneading which the ovaries, along with the uterus, have been subjected to in the over-zealous but well-meaning efforts of the accoucheur to avert a more or less visionary post-partum hæmorrhage, the so-called syncope being the result of shock, pure and simple.

There is only one condition, so far as I know, where the post-partum uterus should, if possible, be grasped laterally through the abdominal walls, and that is in the operation for washing out its cavity. The lateral grasp is for the purpose of compressing the Fallopian tubes in order to prevent any of the fluid from passing through the tubes into the abdominal cavity. The compression in such cases requires only to be very gentle, so that there is little fear of injuring the ovaries.

### *Other Causes of Post-partum Shock.*

Shock may, of course, come on post-partum under other circumstances.

(1.) A tedious and unusually painful labour is said sometimes to account for it, especially if there be much instrumental interference. The nervous system after a severe labour is depressed by pain, starvation, and loss of sleep. Barnes records a case of shock and sudden death ten hours after labour. There was maniacal excitement in the first stage. Delivery was effected easily with forceps under chloroform. There was no post-mortem, and Barnes ascribes the death to "nervous shock which manifested itself before labour, and which was intensified subsequently."

This condition is to be diagnosed from the syncope which some-

times supervenes on the sudden emptying of a largely distended uterus. As a consequence of this sudden lowering of the intra-abdominal pressure there is dilatation of the abdominal veins, followed by temporary anæmia of the brain.

(2.) *Inversio Uteri* occurring post-partum may also cause shock. It can always be easily diagnosed. It is often brought about by improper and over-forcible compression of the uterus in the attempts to express the placenta.

(3.) *Rupture of the Uterus* usually shocks the unfortunate patient before death puts an end to her sufferings.

In one case which I know of where pregnancy was complicated with an ovarian tumour, soon after the accession of labour pains the patient became insensible and manifested all the symptoms of severe shock. On opening the abdomen a fissure was found in the peritoneum covering the side of the uterus, which seemed to account for the condition. A twisted ovarian pedicle may give rise to shock.

(4.) *Injections into the Uterine Cavity* after labour are sometimes followed by an alarming condition of shock. This happens rarely. It is probably caused by some of the fluid regurgitating through one or both Fallopian tubes. Now, it is impossible that the mere entrance of an antiseptic lotion (or even pure water, as I have once seen) into the peritoneal cavity can account for the condition, seeing that in abdominal operations the abdominal cavity can with impunity and great advantage be washed out with a lotion of similar strength. Simmons records a case where most alarming nervous symptoms followed in a case where he injected with plain water, and he quotes a case of Späth's where shock occurred followed by death in seventy-four hours, after the injection of a solution of acetate of lead into the vagina. The post-mortem showed, in addition to peritonitis, a sediment of sulphate of lead on the peritoneal surface of the ovaries.

The shock in such cases is, I believe, due to the reflex irritation produced by the sudden dilatation of the tubes by hydrostatic pressure, owing to insufficient care having been taken to provide for the reflux of the lotion through the cervix and vagina. It is not at all necessary for the production of this form of shock that the fluid should pass into the peritoneal cavity at all. It is not peritoneal irritation which causes the shock; it is tubal distention, and this tubal distention produces a feeling of the most intense anguish. Such cases are, of course, quite different from the form of shock which was once so common, when it was the fashion to inject strong acids and chemicals into a non-pregnant uterus in the treatment of certain conditions. The fluids injected were intensely irritating in themselves, and they were never injected in sufficient quantity to distend the tubes. They produced shock by their direct chemical action on the tubal mucous membrane, and this was shortly followed by intense inflammation and peritonitis.

## CONCLUSIONS.

As a result of the foregoing statements the following conclusions can, I think, be safely made:—

1. The uterus, even in the unimpregnated condition, is usually rotated on its longitudinal axis. This rotation becomes much increased in the later months of pregnancy and during labour. In the third stage of labour and immediately post-partum the transverse axis of the uterus often corresponds to the oblique diameter of the pelvis.

2. In the immense majority of cases this rotation is to the right. The fact that the presenting part of the fœtus usually lies in the right oblique diameter of the pelvis is probably due in great measure to this uterine rotation.

3. The ovaries in pregnancy are in close contact with the lateral walls of the uterus.

4. The uterine rotation consequently causes one ovary (usually the left) to lie forwards towards the middle line, and the other (usually the right) to move backwards.

5. The ovaries have a rich ganglionic nervous supply, derived chiefly from the sympathetic system.

6. The ovaries are enlarged during pregnancy; they are congested, and even slight pressure upon them, when palpated through the abdominal walls, gives rise to pain.

7. Any strong irritation of the peripheral sensitive nerves or of the sympathetic nerves is capable of engendering a series of constitutional phenomena collectively known as "*shock.*"

8. There is a certain class of cases where, after labour, alarming manifestations of nervous prostration and insensibility supervene, and where there is neither hæmorrhage nor any of the other recognised causes of such a condition to account for it.

9. These cases are accounted for by injuries inflicted on one or both ovaries in the management of the third stage of labour. During the necessary manipulations at this period the ovaries run the risk of being bruised between the compressing hand and the hard uterus; or the uterus is forcibly tilted over in such a way that the anterior (left) ovary is squeezed between it and the brim of the pelvis.

10. In such cases the patients always complain of great pain, and the more forcible the compression the greater the pain, and the better marked are the reflex manifestations, amounting in certain cases to the production of shock. Such consequences are always better seen in patients of a somewhat neurotic tendency.

11. Analogies are to be found—(1), In cases of abdominal section for the removal of the ovaries, when, if these organs be much bruised in the process, symptoms of shock at once show

themselves; and (2), in the shock which so frequently results from injuries to the testicles.

12. In order to avoid injuring the ovaries during the management of the third stage, the uterus must be grasped antero-posteriorly, and it must be kept in mind that *antero-posterior* quâ *the pelvis* and *antero-posterior* quâ *the uterus* are not synonymous terms.

13. If the hand be passed into the pelvis antero-posteriorly the ovaries are apt to be included in the grasp. The hand must therefore be placed obliquely in the pelvis, and then it will grasp the uterus antero-posteriorly. When much force is necessary, special care must at the same time be taken to press the uterus in the proper axis of the pelvis.

14. When the patient is lying on her left side the operator's left hand naturally sinks into the pelvis obliquely, and so the ovaries escape danger.

15. If a patient should complain of much pain during the manipulation of the uterus in the third stage of labour, one should fear that the ovaries are being compressed, and the grasp of the uterus should be changed.

16. It is often difficult to tell in the third stage of labour and immediately post-partum which is the anterior and which is the posterior surface of the uterus, as at these times it frequently presents a somewhat globular shape.

17. The only condition in which the post-partum uterus should be grasped laterally is in the operation for washing out its cavity. The grasp in such a case requires only to be very gentle.

18. Post-partum shock may be due to other causes besides injury to the ovaries.

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*Dr Barbour* thought we must distinguish between anatomical and physiological rotation. That the uterus lay slightly rotated in pregnancy there was no doubt; that it rotated itself during the contractions of labour was not yet demonstrated. From Dr Haig Ferguson's using the analogy of the heart, he implied that physiological rotation occurred,—that is, that during a pain the uterus turned on a vertical axis. As to the compression of the normal ovaries producing shock, there was no evidence that the normal ovary was sensitive like the testicle. When pain is produced on compression of the ovaries it might be due to a localised peritonitis rendering the ovarian region sensitive. If compression of the ovaries produced shock, we should have this as a frequent occurrence in Tait's operation, where the ovaries are constantly squeezed, and more directly than ever during the third stage of labour. Dr Barbour had noticed alterations in the respiration and other evidence of disturbance in some cases when the pedicle was being tied, but never on grasping the ovary. He congratulated Dr Haig Ferguson on his interesting and comprehensive paper, although he did not agree with all his conclusions.

Further discussion was postponed.

IV. A paper ON THE TREATMENT OF DISEASES OF WOMEN AT PYRMONT, by Dr Marcus (Berlin and Pyrmont), and communi-

cated by Dr Felkin, was read, of which the following is an abstract:—

After mentioning that the acute diseases of women and such as need operative interference are unsuited to the treatment employed at Pyrmont, the writer refers to the advantages to be derived from a stay there by women suffering from chronic diseases. It is a matter of common notoriety that exudations which have been formed in consequence of inflammation of the pelvic organs are difficult to cure, and may persist for a long time; and, apart from the pain and discomfort they usually give, they form a nidus from which infection may spread, and they are always liable to induce a recurrence of the primary disease which caused them. They are treated by the mud baths at Pyrmont; they rapidly become softer and smaller, and usually entirely disappear during the stay at the spa; but if not, they are infrequently resolved one or two weeks after the patient's return home. The pain they have caused also persists for a short time after the baths have been discontinued, and the same fact is met with in rheumatic affections. In all cases the general health of the patient becomes markedly improved.

Typhlitis and perityphlitis are also treated with decided success; also general exhaustion and debility from whatever cause. Patients suffering from tubercular disease should not be sent to Pyrmont. Malignant disease is of course not cured, but the patient's general health is usually benefited. However, fibromas, lipomas, and myomas grow smaller and softer by the suitable use of the mud and brine baths, and in some rare cases they entirely disappear. All chronic catarrhal inflammations of the mucous membrane of the female genital organs are frequently cured in a surprisingly short time, without any local treatment whatever. Obesity in plethoric individuals is much benefited, as well as chlorosis or anæmia; and women who are the subjects of habitual miscarriage, and even many cases of sterility, are cured.[1]

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## Meeting V.—March 8, 1893.

Professor A. R. Simpson, *President, in the Chair.*

I. *Dr Milne Murray* showed (for Dr Croom) a Drawing and Photographs of a patient with large ELEPHANTIASIS OF THE VULVA. The following is Dr Croom's report of this case:—

Though elephantiasis arabum is a well-recognised pathological

[1] This paper was published in full in *The Provincial Medical Journal*, July 1st, 1893, p. 358.

ELEPHANTIASIS ARABUM VULVÆ.

condition, yet its occurrence in this country is rare, and the recorded cases are correspondingly few; and much more so is this the case where the seat of the affection is in the female genitals, so that a report of the following case is of interest. True elephantiasis affecting the vulva is rarer than at first appears on examining the literature of the subject, since many cases have been recorded as such which on examination prove to be not really elephantiasis, but simply conditions of exaggerated lipoma or fibroma, or even some tertiary syphilide which bore a close resemblance in external appearance; and in some others, while the pathological description seems to correspond to the recognised appearance of elephantiasis, there is associated with the growth of the tumour a history of previous or concomitant venereal disease.

Elephantiasis arabum vulvæ is a disease described as occurring not infrequently both in India and Barbados; but that it is not confined to any particular locality is sufficiently attested by the records of occasional cases in French, German, and other European literature on the subject.

The case now recorded was that of a married woman, aged 32, who had borne three children, the youngest of whom is six years old. Apart from physiological amenorrhœa her menstruation had always been regular. At the age of 13 she suffered from tubercular destruction of the glands of the neck, the evidence of which is manifested by the presence of very numerous cicatrices in that region. With the exception of this ailment she enjoyed good health up till about five years ago, when the glands in the groin of the right side suppurated and broke down, healing slowly and leaving the usual scars. Twelve months thereafter she first noticed the commencement of the swelling in the right labium, and this has continued to increase. About two years ago the left labium commenced to hypertrophy, and this was also preceded by the destruction of several of the glands on the corresponding side. This enlargement of the left labium has not, however, progressed to any extent. The tumour of the right side is well represented in the accompanying Zincograph, which was taken when the patient was completely anæsthetised. Towards the mons veneris, and over its most dependent part, the tumour is hard and nodular or *papillomatous*, but at the side where it is in contact with the thighs it is soft and smooth, or *glabrous*, to adopt the usual nomenclature.

To indicate its dimensions more exactly than can be shown in any diagram, the measurements were found to be—antero-posterior diameter, 12 inches; lateral, 6 inches; and vertical, 6 inches. The base of the attachment, although being a long one, is somewhat narrower than the dependent part of the tumour, so that it is fairly movable, and might be described as faintly pedunculated. At times the patient suffered great pain in the affected part, and

on other occasions it became inflamed and erysipelatous, she herself describing this as "the rose."[1]

After elevating the tumour so as to cause as complete depletion as possible, the mass was removed by a single sweep of a large amputating knife, and thereafter the individual vessels were dealt with *seriatim*, the hæmorrhage being inconsiderable. As the disease, however, had spread up over the mons veneris, a large quantity of redundant tissue had to be removed by dissection, which added very considerably to the extent of the wound and the difficulty of the operation.

The edges were then drawn together and sutured, and as there was a copious discharge from the gelatinous-like tissue, a drainage tube was introduced at the most dependent part of the wound. This was removed at the end of two days, and the patient has made a good recovery.

As to its pathology, the great bulk of the tumour appeared to consist of a gelatinous mass diffused over the area of swelling, and enveloped in a layer of skin and epidermis, which had not, to all appearance, undergone much change. This tissue on examination was found to consist of a hyperplasia of the cellular elements of the connective tissue and lymph spaces between, enormously dilated, from which a watery fluid flowed on slightest expression, and had originally consisted of the deeper layer of the dermis and the subcutaneous connective tissue. No great thickening of the epidermis was noticeable on microscopic examination, but the papillæ were larger than normal and occurred at much wider intervals, whilst in some parts of the substance of the epidermis there were present dilated lymph spaces. Nerve bulbs were awanting in the parts examined.

Those portions previously described as being hard and papillomatous consisted for the most part of dense fibrous tissue covered by a hypertrophied epidermal coating.

Cornil and Ranvier consider elephantiasis of the vulva histologically under three principal forms:—

1st, Where the entire derma is hypertrophied and assumes embryonic characters, in the midst of which are greatly dilated lymph spaces.

2nd, That which succeeds repeated œdema and affects wide areas when there is general stagnation of the lymph system. In this variety especially there occurs often a fibrous alteration in the ganglia.

3rd, Enormous increase in the derma, with proliferation of all its elements, and dilatation with lymph of the intervening spaces.

[1] It is of interest to note in this connexion that in some of those islands where elephantiasis is not uncommon the disease itself receives the name of "the rose" from the aborigines.

Whether associated with the *filaria sanguinis*, or having its origin from any other cause, in all varieties the constant lesion is a dilatation of the lymph channels, and without doubt this occurred in the case now reported, and probably had its initial causation in the destruction of the lymphatic glands and the consequent obstruction of the lymph stream, accompanied by stagnation and accumulation of lymph.

II. *The President* exhibited two UTERI which had been extirpated by the vaginal method because they were carcinomatous. The one patient had the following history:—Mrs F., aged 43, vi-para, admitted to Ward XXIV. January 12, 1893, complained of irregular discharges of blood, and pain in the small of back. Six months before, patient first noticed, when walking, a discharge of blood from the vagina, which lasted for 1½ hours. Since then, every few days similar discharges have occurred, the quantity being less in amount. She gradually became weaker, paler, and thinner. Two months ago, on a market day, after she had worked hard and walked several miles, an excessive discharge of blood came away, followed by a slight discharge, which lasted for several days. Then she again lost a large quantity. She then took to bed. Slight discharges have occurred ever since. On admission the patient was found to be suffering from a fungating carcinoma of the vaginal portion of the cervix. The other patient was also a married woman, of whose history the clinical clerk had made the following notes:—Mrs B., aged 48, xi-para, admitted February 20, 1893, complaining of an offensive coffee-coloured discharge from the vagina. A year before, it was first noticed, appearing at irregular intervals, and being slight in amount. The odour was very bad. There was no pain. Menstruation ceased six months ago. Eighteen months ago it stopped for three or four months. She never suffered from menorrhagia or dysmenorrhœa. On examination the patient was found to be suffering from cancer of the posterior cervical wall, which had evidently started in the substance of the wall. In this case[1] only six days had elapsed since the operation, but the condition of the patient was in all respects satisfactory.

III. *Dr J. W. Ballantyne* showed—(*a.*) A STEAM-STERILIZER FOR INFANT FEEDING. It was known as the "Arnold," and had, in his opinion, certain advantages over the Soxhlet apparatus. (The sterilizer was shown, and its mode of working demonstrated.) It was recommended that the bottles containing the milk should be plugged with cotton wool during the process of sterilization, but he (Dr Ballantyne) used by preference india-rubber stoppers and glass rods. He had recommended the instrument-maker to pro-

[1] Both patients have been dismissed from the Infirmary feeling quite well.

vide along with the Arnold instrument a sufficient number of india-rubber teats as well as the india-rubber corks and glass rods mentioned above, and with these additions he was of opinion that this form of sterilizer was the best at present in use. It had certain special advantages: for instance, it was easy to keep it supplied with water, as it could be seen at once when a fresh supply was needed; sterilization began in a very few minutes after the apparatus was put upon the fire, for the quantity of water to be heated was small; the bottles were less often cracked than when they were standing in boiling water; the milk prepared in this way had not so flat a taste as that from other sterilizers, as there was less air expelled during the process; and, finally, the whole apparatus was not so large and cumbrous as was, for example, the Soxhlet sterilizer.

(*b.*) Photographs of a HYDROCEPHALIC FŒTUS, and drawing of a frozen section of the head. He was indebted to Dr R. A. Lundie for the specimen and the following clinical notes:—The mother, 28 years of age, was a stout, strong woman, living in comfortable circumstances. She had always been healthy. Menstrual history normal. She had married when 23 years old, and had two normal pregnancies (children 4 and 2 years old respectively) and one miscarriage at about the second month, which occurred a year ago. The pregnancy which resulted in the birth of the hydrocephalic child was the fourth. No abnormal symptoms were noted during its course. The waters were said to have come away three days before delivery, and the fœtal movements to have ceased two days before delivery. The labour was rapid. The membranes, cord, and placenta seemed normal. The father, 30 years of age, was a healthy man, thin, dark, and rather neurotic. He came of a neuro-bilious stock. The mother's mother had had a good many miscarriages, but her living children showed no special morbid tendency. The hydrocephalic infant, a female, measured 54 cms. in length, and weighed 3270 grammes. The circumference of the head was 50 cms. The occipito-mental diameter was 21 cms., the occipito-frontal 20 cms., and the suboccipito-bregmatic 18 cms. The vertical measurement of the head was 15 cms. The antero-posterior diameter of the trunk at the level of the diaphragm was 9·5 cms., and at that of the umbilicus 8·5 cms. The skin was peeling off in various parts of the body, especially round the ankles and wrists and on the buttocks and shoulders. The section of the head showed that this part of the body had been greatly compressed during delivery. There was a herniation of the brain substance through the posterior fontanelle, which was large: one parietal bone was driven in under the other, whilst the two halves of the frontal were crushed backwards and downwards into the brain substance, and the hydrocephalic fluid lay partly inside but chiefly outside the bony cranium. The spinal canal and cord were normal.

There was no thumb on the right hand (which was clubbed), and no radius in the right arm. In connexion with the last-named circumstance, Dr Lundie had made him acquainted with an interesting fact: in the mother the balls of both thumbs were deficient, so that these digits could not be properly opposed; they could be flexed across the palms, but not turned so as to face the fingers. The thumbs themselves were rather ill developed, and the usual fold marking the line of flexure was absent. The condition was congenital, and her sister had one thumb similarly affected.

## IV. THE OCCURRENCE AND SIGNIFICANCE OF ROTATION OF THE UTERUS.

By J. C. Webster, M.D., M.R.C.P.E., Assistant to the Professor of Midwifery and Diseases of Women and Children in the University of Edinburgh.

### Rotation of the Uterus.

#### I. *In the Nullipara.*

The statements current regarding the rotation of the uterus in the nulliparous adult have been derived mainly from clinical examination or from post-mortem dissectional study. The facts derived by the former of these methods are not at all to be depended upon, because—

1. It is impossible by the bimanual examination, especially in the nullipara, to distinguish a slight degree of rotation, or to be sure that the rotation felt is not caused by artificial disturbance of parts.

2. Care has not been taken to distinguish between true inherent rotation and that due to accidental conditions,—*e.g.*, temporary changes in intra-abdominal pressure, altered degrees of fulness in bladder or rectum, and peritonitic or cellulitic cicatrization.

In using the term "rotation," it is necessary to distinguish between *inherent* or *true*, and *secondary* or *accidental* rotation. In this paper I am mainly concerned in emphasizing this distinction and in endeavouring to describe the nature and frequency of occurrence of the former variety. By inherent or true rotation, I mean a quality impressed upon the organ in its growth and development.

According to some writers this alleged characteristic is the result of a tendency to torsion possessed by the uterus along with most of the structures in the body. The importance and significance of this tendency are not yet made clear to us. Perhaps unnecessary ingenuity has been employed in tracing out a torsion tendency in the tissues.

As regards the uterus, were long-axis rotation one of its growth characteristics, we should expect to find it in the great majority of cases. Yet even those who describe the condition mention it as occurring only in a comparatively small number of cases.

A careful study of the works of Ernst Fischer,[1] the great authority on this subject, teaches us that we are not at all justified in speaking of a torsion tendency in the human uterus. Fischer's statements refer to the organ, not in its single well-formed condition, but considered as a double organ, formed by the blending of two laterally placed halves.

While Fischer describes the tendency to spirality in the arrangement of the muscular fibres of each half of the uterus, he does not describe any special rotation of each half on its long axis. In each of these, he says, the muscular bundles show a tendency to homodromous spirality, according to the general law which he has formulated, viz., the structures in the right half of the body show a left spiral and those in the left half a right spiral arrangement.

Fischer's conclusions regarding the uterus are principally derived from a study of lower animals, and in the human subject in cases of bi-cornuate uterus. He specially says that the farther one goes from animals with a single uterus, the better can the condition be studied.

As to the existence of rotation in the Müllerian ducts in early fœtal life, I can find no mention anywhere.

Freund[2] distinctly states that the foldings noticed in the Fallopian tubes develop only after the junction of those parts of the Müllerian ducts which give rise to the uterus.

The recent works of Nagel[3] on the development of the uterus make no mention of early spirality, but the author states that the folding of the tubes which we see in early fœtuses is due to their very marked increase in length after the uterus is formed. Even if the ducts did show individual rotation, we would only expect that, after they become blended, there would be no rotation in the single organ, because of the neutralization of a right and left homodromous tendency. There is, indeed, no proof from embryology that the human uterus in its normal condition has impressed upon it any tendency to rotation on its longitudinal axis.

3. Ordinary post-mortem dissection cannot be trusted for the determination of the true position and relationships of the uterus.

[1] *Das Drehungsgesetz bei dem Wachstum der Organismen*, Strasburg, 1886; *Beitrag zudem Drehungsgesetz bei d. W. d. O.*, Berlin, 1887.

[2] "Ueber d. Indicationen zur operativen Behandlung d. erkrankten Tuben," *Volkmann's Sammlung Klinischer Vorträge*, No. 323.

[3] *Ueber die Entwicklung der Uterus und der Vagina beim Menschen*, Bonn, 1891; *Ueber die Lage d. Uterus im menschlichen Embryo*, Leipsig, 1891.

This has been proved not only in the case of the uterus, but as regards the liver, spleen, and many other structures in the body by His, Braune, Symington, and other workers. It is evident, then, that frozen sections can alone afford us accurate information, and at present the number of cases examined are far too few to enable us to have an accurate idea as to the frequency of the occurrence of inherent rotation of the uterus.

The latest work[1] on the nulliparous uterus has recently been published by Waldeyer, and contains some instructive facts. In formulating his conclusions as to the position of the uterus in the nullipara, he makes no reference to rotation whatever, though he enters fully into all the other deviations found in the organ. It is very instructive to observe that his studies have, in reference to another point, viz., the deviation of the uterus as a whole from the middle line, led him to conclude that, contrary to the long-held opinion, the organ is more often nearer the left than the right side of the pelvis.

I have, up to the present, examined ten bodies by means of sections from the fifth month of fœtal life up to puberty, and while I have noticed right and left deviations of the uterus as a whole or of the fundus, I have not been able to make out rotation of the uterus in a single case.

In regard to the fœtus, Ballantyne, in his recent volume,[2] notes that only in one of his cases did he find the uterus rotated, and in that case the torsion (which was to the left) seemed due to a distended loop of sigmoid flexure in the right half of the pouch of Douglas. It is also to be noted that Symington, in his *Atlas of the Topographical Anatomy of the Child*, makes no mention whatever of uterine rotation.

I do not mean to say that true rotation never exists; it has been undoubtedly observed, but, as far as trustworthy records go, we cannot speak accurately with reference to the frequency of its occurrence, though the presumption is in favour of its being found in only a small percentage of cases.

## II. *In Pregnancy.*

The statements hitherto current as to the rotation of the pregnant uterus are even more unreliable than those relating to the non-pregnant organ. Clinically, it must be admitted it is utterly impossible, except, perhaps, in a rare case, to estimate rotation in the softened, bag-like, and easily moulded uterus. There is no proof whatever that rotation characterises the growth of the gravid uterus (as spirality marks the growth of certain plants). This

[1] *Beiträge zur Kentniss der Lage der Weiblichen Beckenorgane, etc.*, Bonn, 1892.

[2] *Introduction to the Diseases of Infancy*, Edinburgh, 1891.

statement has been made from a comparison with the changes which take place in the cow's uterus in pregnancy. In this animal rotation of the uterus occurs sometimes to a marked degree. The explanation of this occurrence is not to be found, however, in any vague theory of inherent rotation-tendency, but in a very simple physical fact. The animal walks on all fours and has a bi-cornuate uterus, one horn of which only becomes pregnant. As this horn grows and becomes heavier, from occupying the side of the pelvis it sinks more and more into the abdomen, tending to fall towards the middle line, thus causing a twist to occur in the cervix or upper part of the vagina.

Some have compared the growing pregnant uterus to the heart in action, and have said that the former becomes rotated just as does the latter in systole. It is not difficult to understand how misleading are speculations based upon such an unfair analogy.

Again, in pregnancy, as in the nulliparous condition, no effort has been made to distinguish between inherent or growth-rotation and that due to the varying conditions of intra-abdominal pressure, bladder and bowel distention, or to the contraction of old inflammatory adhesions. There is no doubt that these conditions can alter the shape and position of the uterus to a much greater extent than has hitherto been thought possible. Waldeyer has especially referred to this in his latest work, and he describes a 5½-month pregnancy case in which the fundus of the uterus is markedly pushed into the left iliac fossa by the small intestines distended with gas. (Waldeyer mentions the special care with which this body was frozen.)

Other workers have shown how the uterus is moulded by the vertebral column, by tumours, and by other structures in contact with it. Our knowledge in relation to this point must remain incomplete until a larger number of frozen sections have been made, for this method is alone able to make out the altered relationships accurately.

We know enough, however, to justify us in discrediting the statements and statistics which exist regarding the conditions found on clinical examination—classed hitherto under the term "rotation."

Some have insisted upon the influence of rotation in modifying the position of the fœtus. There is no proof whatever that there is any relation between these conditions. The statement is a speculation which is incompatible with our knowledge of the anatomy of the parts concerned. The factors influencing the position of the child are not yet satisfactorily settled. Of great importance, certainly, is the moulding influence of surrounding structures on the ovoid uterus. That the slight degree of rotation which may sometimes be found in the uterus can have any

influence seems impossible. At any rate this cannot be estimated clinically.

No doubt many conditions of the uterus described as rotation and associated with various positions of the child, have been in reality only mouldings of the organ on the fœtus by the examining hands, or against surrounding structures.

Another method employed to determine the rotation of the pregnant uterus is to make out the position of the ovaries. Some authors refer to the remarkable ease with which the ovaries can be palpated. They must be surely gifted with extraordinary powers of touch, for I believe it is the common experience that only very occasionally can one be certain that he feels the ovaries lying against the soft wall of the pregnant uterus, while in the great majority of cases one is absolutely uncertain.

Haig Ferguson[1] has expressed himself most emphatically on this point, and he makes the statement that in pregnancy the right ovary moves backwards and the left one forwards, so that they lie practically in the right oblique diameter of the pelvis, and he says that the cause of this change must be the rotation of the uterus. I beg to challenge both the accuracy of the statement and the groundwork of its interpretation.

The relation of the ovaries to the uterus in pregnancy has been chiefly worked out in the cadaver by Dr Barbour and myself. The facts presented by our sections show that the ovaries *do not take up definite positions corresponding to rotation of the uterus on its long axis,—e.g.*, in an eight-month case in which there was some right rotation of the upper part of the uterus, the appendages lay in almost corresponding positions in each iliac fossa. Owing to the mobility of the upper portion of the broad ligament, and the length of the ovarian ligament, the ovary is capable of independent movement through a considerable range in pregnancy as well as in the non-pregnant condition, and it can certainly be altered in position by movements of the bowels as well as by alterations in intra-abdominal pressure.

Their position, in the great majority of cases, gives no exact indication whatever as to the rotation of the uterus on its long axis. Only in a case where the uterus is greatly twisted is there a necessary corresponding alteration in the position of the ovaries.

No doubt many of the untrue or unproven statements regarding normal pregnancy have been founded upon observations made in cases of Cæsarean section. Here, occasionally, marked rotation of the uterus is sometimes found, with corresponding change in the ovaries. These cases are, however, abnormal; in most of them there is very marked pelvic contraction, and the uterus must necessarily hold a relation to the pelvis and abdomen very different from what exists in the normal woman.

[1] *Obstet. Socy. Trans., Edin.*, vol. xiv.

## III. *In Parturition.*

The statements made in the foregoing section hold good for this period. Our knowledge regarding the position of the ovaries and the rotation of the uterus during labour is as yet incomplete.

As far as the most careful anatomical investigations show, the only conclusion that can be arrived at is, that *the ovaries do not take up definite positions corresponding to the rotation of the parturient uterus.* Thus, in the first stage case[1] described by Dr Barbour and myself, in which there was some right rotation of the uterus, it was the right ovary and not the left which lay most anterior. In a first stage case[2] of Dr Barbour's, in which there was practically no uterine rotation, the right ovary lay anterior to the plane occupied by the left.

In Barbour and Webster's second stage case,[3] in which there was very slight right uterine rotation, the right ovary lay a little anterior to the left, because of the disposition of the broad ligaments in their upper parts, the right one being turned forward so that its anterior surface lay against the uterus, the left one being turned backward.

These facts are sufficient to at least discredit the positive statements current, to the effect that in labour there is marked right rotation of the uterus, and that the left ovary lies much anterior to the right one.

## IV. *During the Third Stage.*

We are as yet in want of facts derived from anatomical study in regard to the relations of the uterus and appendages during this stage. Thiede,[4] Stratz,[5] Benckiser,[6] and others have described the uterus removed from the body, but topographical descriptions are as yet wanting. From clinical examination, which is a more reliable method in this period than in pregnancy and labour, there is no reason to believe that rotation of the uterus is any more marked, or that the ovaries have any more a fixed position, than during these other periods.

There can be no doubt whatever that the main part of the retracted uterus immediately after the birth of the child, the patient being on her back, lies above the brim, with its transverse diameter practically parallel with that of the pelvis. Owing to its extreme mobility at this time it is very easily displaced by altera-

[1] *Op. cit.*, p. 30, Pl. vii. fig. 2.
[2] *The Anatomy of Labour and its Clinical Bearing*, 1889.
[3] "Anatomy of Advanced Pregnancy and of Labour," *Laboratory Reports R.C.P.E.*, vol. ii.
[4] *Zeitschrift f. Gyn.*, Bd. iv.
[5] In Schroeder's *Der Schwang. u. Kreiss. Ut.*, Bonn, 1886.
[6] *Zur Anat. d. Cer. u. unt. Uterinseg*, Benckiser u. Hofmeier, 1887.

tions in the condition of the bowels and by changes in the mother's position.

Another important fact to bear in mind—one to which little attention has been paid—is that the shape of the third stage retracting and contracting uterus varies according to the position of the placenta on its inner wall. No doubt many of the cases described as rotation are really only moulding of the uterus on the placenta.

Again, during the progress of the third stage, when the placenta, after being separated, lies, partly or wholly, in the lower uterine segment and cervix, or partly or wholly in the vagina, the body of the uterus riding on the top of the mass may be twisted or displaced upwards or to either side in a variety of ways, the nature and amount of the change in the uterus depending upon the size and disposition of the placenta.

### V. *In the Puerperium.*

In regard to this period there is much misunderstanding as to the relations of uterus and appendages. One opinion that is current, viz., that there is no difficulty in determining these clinically, I must emphatically protest against. Take, for example, first of all, the question as to whether the uterus after labour is centrally placed. Statistics from clinical observation state that in the majority of cases it is so placed, but that in some cases it is nearer the right, and in others the left side. Now, while these statistics undoubtedly point in the direction of truth, they must only be taken as approximately true. They give no exact indication as to the percentage of deviation. In attempting to estimate rotation of the puerperal uterus, there are many difficulties in the way of arriving at a correct estimate as to its frequency and extent.

In the early days of the puerperium, when the pelvic cavity is so largely filled by the uterus, it is very difficult clinically to measure accurately the distance between the uterus and the bony wall. It is not sufficient to draw conclusions from the palpation of that part of the organ above the brim. As I have recently shown,[1] asymmetry of the fundus uteri may be found along with a centrally placed position of the whole organ. Hitherto, clinically this asymmetry has always been attributed to lateral deviation.

Again, it must be remembered that after labour, in the empty condition of bladder and rectum, the great mass of the uterus is below the brim. The outer examining hand can only palpate this portion. But owing to the differences in the shape of the post-partum fundus, and to the moulding which it may receive from

[1] *Researches in Female Pelvic Anatomy*, Edinburgh, 1892.

surrounding structures, it cannot be taken as an exact guide to the amount of rotation of the uterus.

The position in which the patient is examined is also important. The results may not be the same in the dorsal and lateral position. Pathological deviation of the uterus must also be excluded, and the varying conditions of bowel and bladder must be borne in mind. Deformities of the pelvis must as well be taken into account. Haig Ferguson[1] has drawn unwarranted conclusions from Stratz's *post-partum* case, in which the pelvis was contracted. As I have recently shown, the intra-pelvic relations in a contracted pelvis are *entirely different* from those in the normal state.

Again, it is necessary to note the day of the puerperium in which the patient is examined. Erroneous conclusions may be drawn unless this be done.

Finally, the method of estimating clinically uterine rotation by the position of the ovaries is as fallacious after labour as before or during. Though, immediately after labour, we may in some cases make out the ovaries with considerable ease, it is difficult, in the majority of cases, even where they are accessible, to distinguish them with accuracy. In most cases, as all my recent work has shown, they lie, in the early puerperium, almost entirely above the brim, packed in between the uterus and the pelvic wall and covered with intestines, their relation to one another and to the uterus varying in different cases. Owing to the mobility of the upper part of the broad ligaments they are capable of free movement, though to a much less extent than in the non-pregnant or pregnant condition. Before labour the ovarian ligament is well marked. After labour, however, owing to the lateral extension of the retracted and contracted uterus into the broad ligaments, the ovaries get to lie close to the uterine wall, their inner ends appearing to be attached to it directly, the ovarian ligaments being practically obliterated, having become spread out on the wall of the uterus. The ovary, while fixed at its inner end, is capable of moving around this point; the outer end may thus be found in front, above, behind, or below the attached end. Again, in comparing the position of the organ on each side of the pelvis, we find that there is no fixed relationship, but a varying one both as regards one another, the uterus, and the pelvic wall.

These facts, derived by the most accurate anatomical study, point to the conclusion stated already in reference to pregnancy and labour, that *in the puerperium the ovaries do not take up definite positions corresponding to the rotation of the uterus on its long axis.* As to actual rotation of the uterus, apart from pathological or mechanical deviation, all careful anatomical study shows that it is no more marked in the puerperal than in the nulliparous woman.

[1] *Edin. Med. Journ.*, May 1893.

*Clinical Bearings of these Facts.*

Rotation of the uterus is of such minor importance that its clinical significance is not usually regarded as worthy of attention. Recently an attempt has been made to show that this condition is of great importance in relation to the treatment of the third stage of labour.

Haig Ferguson[1] and Newell,[2] supposing that the uterus is markedly rotated to the right in the third stage, and that the ovaries are correspondingly rotated, have criticised the long-adopted Credé method of grasping the uterus for the purpose of expelling the placenta, viz., that in which the hand is placed antero-posteriorly *quâ* the pelvis, the thumb being behind and the fingers in front. They say that on account of rotation the ovaries are apt to be compressed, giving rise to a condition of shock, and they recommend that the uterus should be grasped obliquely in the line of the left oblique diameter. From the abundant anatomical considerations which I have brought forward, especially those referring to the relation existing between rotation of the uterus and the position of the ovaries, we see that there is no justification whatever for Ferguson's and Newell's criticisms of the Credé method of grasping the uterus, nor for the proposed grasp which they would adopt in place of it. The anatomical evidence shows that such a change would be far more likely to be associated with compression of the ovaries.

But besides the anatomical facts, there are the following clinical considerations, which stand in the way of our acceptance of their views on "*post-partum* shock":—

1. If the Credé method is so dangerous for the ovaries—so widely has it been employed and for such a long period—it is remarkable that we have on record only the few cases recorded by Ferguson and Newell.

2. It is important to note that these cases occurred in neurotic women (in one of them puerperal melancholia actually developed). There is no reason against supposing that the condition of shock may have been to a large extent produced as a result of the mere Credé manipulation of the uterus, *apart from any compression of the ovaries.* According to the authorities,[3] the slightest lesion or pain may cause shock in persons of *neurotic temperament.* This would be especially true in the case of the grasping of the uterus, if the organ were rendered exquisitely sensitive to pressure by the existence of perimetritic patches. It is well known that pressure on these, even in otherwise healthy women, may cause great pain; in a neurotic woman it would make her far more liable to shock. Ferguson especially notes that all of his cases "complained of

[1] *Edin. Med. Journ.*, May 1893.
[2] *Leonard's Illus. Med. Jour.*, Detroit, 1890.
[3] *Quain's Dictionary of Medicine*, p. 1427.

unusual tenderness when the uterus was grasped in the hand in the usual way, through the abdominal wall, after the expulsion of the child," before any forcible compression was tried.

3. While there is very little doubt that forcible compression of the ovaries, especially if they are inflamed or cystic, may give rise to shock, we have no idea whatever as to the frequency with which compression is followed by shock. In abdominal sections shock is sometimes seen, and may be due to rough handling of the appendages, though in most cases it seems due to severity or protraction of the operation, especially if there be much loss of blood. If irritation of the ovaries were an important cause, then shock should be a very common complication in laparotomies for the removal of the appendages where they are diseased and bound down by inflammatory adhesions. In these cases there is often very rough handling of the ovaries without the accompaniment of shock. In difficult cases, also, where part of an ovary is left in the pedicle embraced by the ligature, no special tendency to shock has been recorded.

In conclusion, it seems to me that, as regards the question of grasping the third-stage uterus, there can be no doubt as to the safest method to employ, viz., to place the hands together on the fundus, their radial edges being in apposition, the thumbs being opposite the vertebræ, and the fingers above the symphysis. In this way there is the least danger of compression of the ovaries.

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*Dr J. W. Ballantyne* said that as his observations on the condition of the uterus in the fœtus had been alluded to by Dr Webster, he might be allowed to add that he had recently had the opportunity of examining frozen sections of the pelvic organs in several full-time infants, and had in only one case found rotation of the uterus. In that instance, as in the one referred to by Dr Webster, the rotation could be explained; for there were traces of peritonitis, the right ovary and Fallopian tube being adherent to the intestinal coils in the neigbourhood of the cæcum. At the same time he did not think that the question whether the fœtal uterus showed or did not show rotation had much bearing upon the problem of uterine rotation in the pregnant or post-partum condition.

*Dr Haig Ferguson* begged to thank Dr Webster for his paper, which interested him greatly, as showing, from the difference of his conclusions from those of Dr Ferguson, that the latter's opinion that anatomical work alone could not be relied upon entirely for clinical purposes, was to some extent justified. Most of Dr Webster's objections to Dr Ferguson's paper would, he thought, be found fully answered in the paper in question, to which reference might be made, so that he would not detain the Society by answering all the points *seriatim*. Dr Webster, how-

ever, seemed to argue erroneously with regard to uterine rotation in fœtal life. No such rotation probably existed as such, but one, Müller's duct (the left), usually lay somewhat in front of the other, thus giving the uterus a "set" in an oblique direction. Dr Webster was apparently in error in ascribing the rotation of the pregnant uterus to the position of the child. There could be little doubt but that the position was greatly determined by the uterine rotation. Dr Milne Murray expressed very clearly his belief that the obliquity of the uterine muscular fibres must necessarily produce rotation. Dr Ferguson was glad to hear him make this statement, which was in agreement with what Dr Ferguson had shown in his paper to be an intrinsic cause of rotation acting both actively and passively. Dr Webster explained the frequent uterine rotation in the cow to the fact that only one horn of the uterus was occupied. The same principle held good in the human uterus: the right half was usually more developed than the left, and the more greatly developed part tended to pull back its corresponding side. Dr Webster had said that the ovaries did not follow the uterus as it rotated, whereas there could be little doubt but that they did. No doubt there were other causes than mere pressure on the ovaries which might produce pain and shock, but it was none the less true that pressure on the ovaries was a distinct and probably more frequent cause of pain. The whole matter resolved itself into this, that the uterus should be grasped antero-posteriorly as regards itself, and not as regards the pelvis, in the third stage of labour, and pressure downwards should be made in the proper pelvic axis. The directions at present taught of grasping the uterus antero-posteriorly as regards the pelvis were misleading.

*The President* remarked that both Dr Webster and Dr Ferguson's contributions would be found to be of value. Prof. Goodsir used to dwell on the law of spirality that he recognised as a guide in the direction of all kinds of organic growth. Ernst Fischer had even indicated that each individual cell had a tendency to grow spirally. Prof. Pettigrew had illustrated the spiral movements of the wings of birds and the feet of animals. Perhaps the human mind worked in the same fashion, so that science progressed by a series of spiral movements. Our advance towards a true appreciation of the exact lie of the uterus was being guided by Dr Ferguson making a spiral movement in one direction and Dr Webster making a similar movement from the other side. The practical conclusion as regards the grasp to be taken of the uterus in the third stage would be to make practitioners careful that they seized it in an antero-posterior direction *quâ* the walls of the uterus itself, as they usually were, whatever might be the relations of the uterine to the pelvic diameters.

## V. SIMPLE GROWTHS OF THE UTERINE MUCOSA.

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The so-called mucous polypi of the uterus, though known to be the frequent source of marked clinical symptoms, do not seem to have had bestowed upon them the same amount of attention with regard to their structure and mode of growth which has been given to other uterine neoplasms.

Why this should be it is difficult to conjecture; for certainly their frequency, and the severity of the symptoms they give rise to, are sufficient to warrant their closer investigation.

Perhaps it is from their usual small size and the comparative ease with which they are, as a rule, removed, that text-book writers dismiss their consideration in so brief and superficial a manner. In case, therefore, this assumed reason be correct, it is my intention, from a few clinical examples, to show that such is an erroneous idea, as from their occasional large size, severe clinical symptoms, and difficulty of removal and eradication, they deserve fuller and closer description.

Case I.—Patient, aged 32, came under my notice in Oct. 1886, complaining of intense weakness, which she thought was due to constant leucorrhœal discharge, which had lasted nine months. Menstruation regular in amount and recurrence.

On examination the anterior cervical lip was found to have attached to it a bilobed, extremely soft and partially pedunculated red growth, resembling a small tomato. This was removed, and the symptoms ceased. The removal by scissors was attended with considerable difficulty, on account of the friability and vascularity of the tumour, the hæmorrhage requiring vaginal plugging for its arrest.

Fig. 1. Simple adenoma of cervix uteri. Case I.

On examining the growth after removal, its original shape and structure was impossible to define, as from its extreme softness it had been much torn, and was represented merely by bits of broken pulpy tissue. These were sent to Dr Barrett for examination, and were found to be chiefly composed of glandular tissue, lined with columnar ciliated epithelium, and supported, as seen under Microscope 1, by but scanty connective tissue (Fig. 1).

In six weeks patient returned with her old symptoms, and a similar growth, about the size of a bean, was found growing from the same site as before. This I removed with the thermo-

cautery, and kept the patient thoroughly under observation for six months in case of further recurrence, but during this time there was none.

In October 1889 (three years later) she again returned complaining as before, and the growth was again found growing from the same situation. So I now amputated the anterior cervical lip along with the tumour.

The patient is now, I am pleased to say, in excellent health, and no return of the disease is evident. Since the last operation she has been delivered of a healthy son.

CASE II.—Mrs P., aged 70; menopause at 45; in May 1892 complained of severe bleeding from the vagina, and on examination the os uteri was found dilated, and projecting through it was a large irregular mass of a dark red colour. The history, as obtained from Dr Jeffrey, Ayton, was that eighteen months previously the patient had complained of vaginal hæmorrhage, and he found her suffering from a similar tumour of large size, which he removed with difficulty; it weighed 21 oz. Since that time he had removed from her three other growths similar in character, but smaller in size, the last weighing 12 oz. He therefore sent her into hospital to see if nothing could be done to prevent further recurrence.

After removal of the polypus, which weighed 8 oz., the uterine cavity was examined. It was roomy, and measured 5 inches, and situated within it could be felt two rough protuberances—the one on the anterior wall of the uterine body, the other on the posterior wall of the uterus about an inch from the os externum—evidently commencing growths of a similar character.

The polypus was pear-shaped, its external surface irregular, and opening here and there over it were the mouths of canals which evidently invaded its substance. On section, the substance of the tumour varied considerably in consistence, being hardish and fibrous-like in the centre, and gradually becoming softer towards its periphery, while coursing through it canalicular spaces could be seen cut longitudinal and transversely, communicating with the exterior by the openings already described on the surface (Fig. 2).

FIG. 2. Section through polypus from Case II., showing channelled character (A, canalicular spaces opening on surface).

By the nitric acid test of Dr Stiles the structure could be seen by the naked eye to be entirely connective tissue in the centre,

while the periphery and lining of the canalicular spaces were evidently cellular.

The microscope corroborated this excellent naked-eye test, and showed the substance of the growth to be made up almost entirely of connective tissue, while the surface and lining of the canals was formed by a single layer of columnar epithelium.

The connective tissue in the centre of the growth was well-formed fibrous tissue undergoing hyaline change, while towards the periphery the tissue became more embryonic and cellular.

Considering the benign character of the growths, and their apparently but slight effect on the patient's health, it was decided not to perform any radical operation, so the uterine cavity was merely swabbed out with iodine. Since that time, I am informed by her doctor, the patient has spontaneously passed five more polypoidal-looking masses, varying in size from a hen's egg to the closed fist. With each a slight hæmorrhage and pain occurs, but in the interval the patient is well and enjoys good health.

The last one, passed ten days ago (kindly forwarded to me by Dr Jeffrey of Ayton), I have the pleasure of showing.

Its surface is partly smooth and partly rough, the rough portion looking as if the growth had been torn across. The polypus as a whole, where fresh, was softish, about the size and shape of an ordinary Cambridge sausage, and weighed 8 oz.

On close examination by the nitric acid test and the microscope, it is seen to be entirely made up of blood-clot, and is thus an example of a fibrinous polypus. The microscope also shows the fibrinous matrix to be infiltrated by leucocytes and young connective tissue corpuscles, while coursing all through may be seen young bloodvessels, with coats formed of a single layer of endothelium,[1]—facts which conclusively show an attempt has been made at organization of the clot, which must therefore have had intimate and organic connexion with the uterine wall, and thus materially differs from a simple retention clot.

CASE III.—A patient, aged 32, who had suffered from menorrhagia and leucorrhœa for seven months, on examination showed a pedunculated growth, somewhat larger than a chestnut, growing from within the cervix and projecting into the vagina. Its surface was rough and irregular, and had a cauliflower feel, but it was freely movable, did not bleed upon examination, and the vaginal discharge was not fœtid.

FIG. 3. Section of lobule from papillary polypus. Case III. (From Nature.)

On grasping with volsella it bled profusely, and I removed it with the écraseur. The growth, on examination, closely resembled the appearance

[1] Specimen demonstrated under microscope.

of a cauliflower, its rough irregular surface being broken up into a number of cotyledons (Fig. 3).

On microscopic examination it proved to be a connective tissue outgrowth of a papillary type, the individual papillæ being covered by a layer of low columnar epithelium. After removal symptoms ceased, and there has as yet been no return (two years).

CASE IV.—A patient, aged 30, who complained of weakness, the result of menorrhagia, metrorrhagia, and profuse leucorrhœa of some months' standing.

On examination a small pencil-like growth was felt projecting through the os externum and attached to the uterine mucosa, fully an inch up the canal. It was smooth and of firmish consistence.

After removal the microscope showed it to consist of well-formed fibrous tissue, through which coursed numerous glands lined by cylindrical ciliated epithelium.

The surface was covered by numerous layers of stratified squamous cells. On the surface the glands freely opened, the transition from the cylindrical cells lining the gland to the squamous epithelial covering of the growth being quite abrupt.

There has been no return of the growth (eighteen months).

In attempting to classify the growths obtained from the above-mentioned cases, that from Case I. appears to be a well-marked example of a true adenoma, somewhat resembling a type of cervical growth already described by Underhill before this Society as a "Channelled Polypus," but from this it chiefly differs in the small amount of inter-glandular stroma met with.

From the microscopic appearances it must be classified as benign, its recurrence resulting from an insufficient eradication of its base.

In Case III. the seat of active growth is undoubtedly confined to the fibrous tissue of the mucosa, which, growing outwards in a papillary manner, receives a covering of epithelial cells.

From the primary outgrowth secondary offshoots arise in a similar manner, so that the rough, irregular cauliflower surface already mentioned is formed.

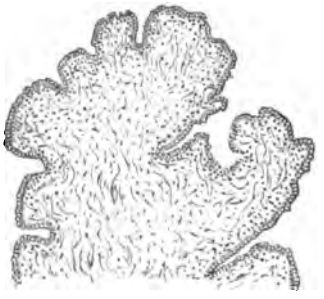

FIG. 4. Microscopical appearances of fibrous papillary polypus, showing the highly cellular periphery with well-formed connective tissue centre. × 40.

From this eccentric growth of the fibrous tissue processes, each covered by a layer of epithelium, the tumour on section appears at its periphery to be riddled with glands; these, on closer

examination, however, may be seen to be the interstices between the fibrous tissue outgrowths, and are not glandular in nature.

That such is the evident development and growth of this somewhat rare variety of cervical tumour is well demonstrated by the microscopes I have placed before you (Fig. 4). From these it will be seen the area of active growth, as recognised by its cellular nature, is situated immediately beneath the epithelium, while as we approach the centre of the primary outgrowth the connective tissue becomes less and less cellular and more fibrous.

The type of neoplasm represented in Case II. is also essentially of a fibrous character, but seems to differ from the papillary growth just described, more in its probable origin and mode of growth than in its structure.

As already stated, this tumour, though mainly composed of connective tissue in all degrees of development, was specially characterized by the presence of canalicular spaces coursing through its substance in all directions. These spaces, lined by columnar epithelium, are evidently enlarged glands. It would thus appear as if the tumour owed its origin to an active hypertrophy of the fibrous tissue over a limited area of the uterine mucosa. The glands situated in this area, though not in themselves actively proliferating as in adenoma, remain and are enormously hypertrophied from the active increase of their surrounding stroma. As in the papillary variety, the seat of active growth would appear to be immediately beneath the epithelium, as there the tissue is more embryonic and cellular in character; but, unlike the papillary type, there seems no disposition to the secondary papillary offshoot, which gives that type of tumour its rough cauliflower-like surface.

The tumour thus described closely corresponds with fibrocystic tumours of the mamma, and which, among many other names, has been described as fibroma intra-canaliculare and cystosarcoma fibrosum. The cysts are formed by dilatation of the enclosed glands. Like these mammary tumours, they must be looked upon as benign, although in a certain percentage of cases (4 per cent.) liable to local recurrence.

A case by Rosenstein of recurrence in the mamma closely simulates Case II. in its history.

They are never associated with metastases or infiltration of the surrounding lymphatics, and it would appear, when they recur, that it is not due to a local malignancy, but to another portion of the glandular structure becoming active, as shown in my case, where, after removal of one polypus, others were felt commencing. The extremely embryonic and cellular character of the periphery of these growths might certainly lead one at first sight to classify them as sarcomata, but from these they materially differ, in that the cells do not maintain their embryonic character, but rapidly develop into mature connective tissue. This sarcomatous appear-

ance is further enhanced by the embryonic character of the blood-vessels in the periphery. These, from the feeble supporting stroma, frequently rupture, and thus account for the hæmorrhages found here and there through the substance of the growth, and may possibly also account for the severe hæmorrhages which form so characteristic a clinical symptom of these tumours.

The fibrinous polypus derived from the same case is of great interest. These growths, though at all times rare, are specially so in the non-puerperal state,—Fraenkel and others even denying their existence independent of pregnancy. Its probable origin has in this case been the rough, irregular surface formed by the commencing polypi, which I described as felt on examination. Upon this rough surface the blood has seemingly become coagulated, and deposited layer after layer in a stalactite manner, till its pedicle has given way and it has been spontaneously expelled. In this manner it is exactly similar to the fibrinous polypi found after labour, which owe their origin to a retained portion of ovum or the roughened surface of the placental site. Naturally, after the examination of this polypus, it is impossible to say how many of the nine removed had been of like nature and how many had been fibrous, but there can be no doubt of the multiple nature of the fibrous variety, as I felt two on examination of the uterine cavity subsequent to the removal of the one I showed.

In the specimen from Case IV. it would seem we have a combination of the previously described variation, viz., glandular and fibrous, but differing markedly from both in its investment of squamous epithelium. In its simplest variety as described by Semon, as a papillary outgrowth from the vaginal aspect of the cervix, such a type of tumour is but to be expected if one considers the normal structure of its site (viz., papillæ covered by squamous epithelium); but when arising from at least ¾ths of an inch within the cervical canal, where papillæ and squamous epithelium are unknown, the structure of the tumour becomes most interesting and difficult to account for.

This covering of squamous epithelium on the cervical growths was first described by Ackermann, and has already been demonstrated to this Society by Underhill.

The stroma in this tumour does not seem to be so embryonic in its structure as in Case II., nor has it the papillary method of growths described in Case III., but it appears to have the nature of a localized hypertrophy in which glands and stroma equally participate.

There is yet another form of mucous polypus, an example of which I show,—*i.e.*, a retention glandular cyst or Nabothian follicle. These are of extremely common occurrence, and require but passing mention.

The varieties of neoplasm I have shown, though they differ considerably from one another, must be considered as essentially

mucous in their origin. Their variety consists in the type of tissue which more actively proliferates. Thus in Case I. the glands seem solely concerned, in Cases II and III. the connective tissue is alone active, while in Case IV. both glands and connective tissue participate.

These growths are thus by some authors—as Pozzi, in his latest work on Gynæcology—not only scantily treated, but looked upon as analogous to ordinary chronic endometritis, only differing in the fact that the inflammation is localized and not general. Doubtless such a classification may be convenient for descriptive purposes, but as a scientific description cannot be too strongly condemned. If adopted throughout, uterine fibromyomata accordingly must be looked upon as localized metritis, and ovarian fibromata as a type of ovaritis,—surely, to say the least of it, a confusing and absurd description. It is surely strange, then, that the papillary fibromata of the uterine mucosa should be looked upon as mere inflammatory excrescences, while similar conditions of the mamma, nose, and intestines are described as definite and independent neoplasms.

Again, growths of the cervix, such as described in Case III., are frequently spoken of as cauliflower papillomata, and are looked upon as being closely allied to cauliflower carcinoma, and even some eminent observers characterize them as initial stages of the latter. That carcinoma or epithelial proliferation may in some cases be the result of the irritation from the actively-growing connective tissue process I do not wish to deny, such cases having been cited by Wagner[1] and others, but to look upon these two varieties of neoplasm as more nearly related to each other than that of cause and effect I cannot entertain. The structures of each are as independent of one another as that of the short-stemmed pipe of the British workman is to the cancer in his lip, yet in both instances it is possible the one would not be present without the other. Yet undoubtedly benign papillomata may exist independently without tending to take on malignant action, just as safely as many a working-man smokes with impunity his short cutty without developing labial cancer.

The gross appearance of these growths is markedly cauliflower-like, but the use of this term as applied to them should be discontinued, as it is so commonly, though unnecessarily, applied to the papillary epithelioma found in this situation, with which, as has been already shown, it has not the slightest connexion, at least in so far as microscopic examination or clinical symptoms can help us.

The usual clinical features of these mucous growths are already too well known to require but passing mention. They are usually associated with hæmorrhage and leucorrhœa. The former probably

[1] *Gebärmutter Krebs*, p. 13.

has a two-fold origin,—first, from the tumour itself, as its bloodvessels are at the periphery embryonic in type, and having a scanty supporting framework, are liable to rupture; and, secondly, from the uterine mucosa generally, this being in a state of permanent congestion. The leucorrhœa is perhaps the most characteristic symptom, and is always present, sometimes in such quantities as to be almost incredible; its character varies, but is generally clear, watery, and odourless, there being little tendency to necrosis of the tumour tissue, which gives the almost characteristic odour to the papillary epitheliomata. The size of the growths is usually limited to that of a hen's egg, but, as Case II. shows, this may be much exceeded, although I may here say that I have failed to find any described case of growths approaching in size those in this case removed.

They, unlike myomata, may occur at all ages, and this feature perhaps forms the most interesting practical point in their consideration. Occurring, as they often do, late in life, many years after the menopause, they give rise to the always gravely suspicious symptom of post-climacteric hæmorrhage, and may be said to form the majority of the small minority of cases in which this symptom is not due to malignant disease.

The diagnosis of papillary fibrous growths from epithelial papillomata is apt to be uncertain; but the absence of decaying tissue giving rise to a fœtid odour, and the slight tendency to hæmorrhage on examination, should help greatly to distinguish the former.

The treatment may be summed up in one word, viz., removal. This is most conveniently performed, if the pedicle be small, by twisting and scissors, and if large by the écraseur.

As they are (unlike myomatous polypi) nourished through their pedicle, the hæmorrhage is frequently copious after its division, and it is thus well to sear the divided stump thoroughly with the thermo-cautery, by which means not only is the bleeding arrested, but recurrence of the growth averted.

From the foregoing I may, in conclusion, say, that it has been my object to bring before the Society these observations upon this somewhat little-considered subject of mucous polypi, and have tried to show—1. That though mucous in their origin these growths vary greatly in structure, there being glandular, fibro-glandular, and papillary fibrous and fibrinous varieties. 2. That they are benign, but may have a local malignancy and recur, but are essentially different from papillary epitheliomata, for which they may be mistaken by their gross appearance. 3. That they frequently are associated with the post-climacteric period, and are thus liable to simulate the signs of malignant disease at this period; and lastly, as regards treatment, it is well, after their removal, to sear the remaining stump thoroughly, to arrest the almost constant accompanying hæmorrhage, and also prevent recurrence of the growth.

From these conclusions and the specimens I have shown, I trust that I have been able to your satisfaction to demonstrate that, from their varying and interesting structure, and from their well-marked and at times severe clinical characteristics, these growths surely demand more than the trivial and altogether inadequate description so frequently bestowed upon them.

The beautiful microscopic sections of these growths I have the pleasure of showing have mostly been prepared for me by Dr Stiles in the Surgical Laboratory of the University.

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*The President* was glad to have heard the interesting record of cases brought before them by Dr Haultain, and the description of the pathological varieties. They illustrated well the various forms with which they were familiar in practice. He (the President) had seen all these varieties, and with regard to the symptoms had found how elderly women with cervical polypi giving rise to hæmorrhage imagined that menstruation was still in progress. Dr Haultain had spoken as if this hæmorrhage and leucorrhœa were the only symptoms to which they gave rise. But cases were met with in practice where neither of these symptoms were present, but their mechanical pressure, or their protrusion at the vulva, revealed their presence. As to their removal, the clip of the scissors might be dangerous, unless the practitioner was provided with means of immediately thereafter arresting hæmorrhage; and he (the President) preferred to twist them off with forceps, or to remove them with the écraseur, or by the loop of a galvano-cautery, or by the Paquelin cautery.

*Dr Haig Ferguson* had listened with much pleasure to Dr Haultain's interesting paper. Fibrinous polypi were, of course, known to occur occasionally in the puerperal state; but he had never heard of any case at all similar to Dr Haultain's, in which well-marked fibrinous polypi developed apart from pregnancy. The clear demonstration of the organisation of the blood-clot in utero was most instructive and suggestive. This, to his mind, explained the circumstance that in one case of post-partum fibrinous polypus which he (Dr Ferguson) had removed lately, the polypus (which was as large as a Tangerine orange) was so firmly attached by a strong, apparently fibrous, pedicle to the fundus uteri. No part of the placenta had been left in utero. With regard to the symptoms of mucous polypi, Dr Ferguson called attention to the occasional development of milk in the breasts in such cases. He recalled one case where mammary engorgement and lacteal secretion were the only symptoms in a patient past the menopause. On removal of the polypus the mammary symptoms disappeared, only to reappear shortly afterwards, when it was found that some more polypi had made their appearance. These were thoroughly dealt with, and there was no more trouble.

*Dr Fordyce* said he had listened to Dr Haultain's paper with

much interest. He considered that leucorrhœa was the most prominent symptom of mucous polypi of the cervix. He quoted the case of a patient who came under his care in the summer of 1892, suffering from a very profuse leucorrhœa and painful and scanty menstruation. On vaginal examination a small mucous polypus was found protruding from the external os. When the polypus was removed four others were found occupying the dilated cervical canal, and were also removed by torsion. The operation resulted in a complete cure of the leucorrhœa and dysmenorrhœa; and the patient, who had been sterile for fourteen years, was now eight months pregnant.

*Dr Haultain* thanked the Society for the manner in which they had received his paper. In mentioning the symptoms associated with these growths he had done so in quite a general way, and leucorrhœa and hæmorrhage being undoubtedly the most prominent and common, he had dwelt on them only; perhaps the most striking point regarding these symptoms was their severity out of all proportion to the size of the growth. He was well aware, as Prof. Simpson said, that very frequently no symptoms of importance were ever present, but that was undoubtedly the exception. He was interested to hear Dr Ferguson had met with a case of lacteal secretion associated with mucous growths, as on two occasions he had had a similar experience, and had difficulty in attributing this symptom to the abnormal uterine condition. He was pleased, though somewhat surprised, to hear that Dr Simpson had seen examples of all the growths he had shown, as he had nowhere been able in the literature to find an authentic example cited of a fibrinous polypus growing in the non-puerperal uterus. He would therefore be very pleased if Prof. Simpson would kindly state a few of the principal points in regard to his case, as it was certainly worthy of putting on record. In answer to Dr Taylor, he might say the patient from whom the numerous polypi were removed was the mother of a family. The removal by scissors he employed chiefly on account of its ease and rapidity, but he always had the thermo-cautery in readiness to check the sometimes copious hæmorrhage.

## VI. THE NATURE OF THE EXPULSIVE PHENOMENA OF THE FEMALE ABDOMINAL CAVITY.

By D. Berry Hart, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Midwifery and Diseases of Women, Surgeons' Hall; Physician, Royal Maternity and Simpson Memorial Hospital; Assistant Gynæcological Physician, Royal Infirmary, Edinburgh; Examiner in Midwifery, University of Edinburgh.

The expulsive phenomena of the female abdominal cavity are three in number, and are concerned with the extrusion of the contents of the bladder, rectum, and full-time uterus. To-night I wish to consider the last mainly, and hope to show that all

three have a common mechanism, and especially that the mechanism of the expulsion of the contents of the rectum and that of the fœtus from the full-time uterus are identical.

I shall consider the mechanisms of urination and defæcation very briefly, as I have already discussed them in a paper on the "Physics of the Bladder and Rectum."

In URINATION the mechanism is that first we have an inhibition of the tonic centre for the urethral muscles. This brings about their relaxation, and then by intra-abdominal pressure and the muscular action of the bladder the urine is expelled. According to some, the bladder is passive, and it is possible that, as the result of the evolution of the upright posture, the expulsive function of the unstriped muscular fibre of the bladder has become less active as that of intra-abdominal pressure has increased.

In DEFÆCATION the mechanism is more complex. We have first to note that the lower end of the rectum below the sphincter tertius is the sensitive part of the bowel. When normal semi-solid fæcal matter occupies this segment we get uneasiness and a reflex strain, which set up—(1), Relaxation of the anus; (2), muscular action on the part of the rectum, causing (*a*) apposition of the mucous membrane above the level of the fæcal mass, and (*b*) some elongation of the fæcal mass; (3), increase in the intra-abdominal pressure, driving down the fæcal mass, which is elongated more markedly and moulded by the anus, and finally expelled in a segmented condition.

## THE PHYSICS OF THE FULL-TIME AND PARTURIENT UTERUS.

It is only within recent years that sufficient facts have accumulated to enable us to consider the question indicated above. The main points have been ascertained by Bandl, Schroeder and Stratz, Waldeyer, Barbour, Lahs, and others, and are related to the anatomy of the lower uterine segment, the physical conditions of the full-time pregnant and parturient uterus, and the remarkable clinical facts observed in labour by Schroeder and Stratz.

I purpose taking up this question under the following divisions:—

1. *The Relation of Uterine Wall to Uterine Contents.*
2. *The Nature and Phases of Uterine Contraction.*
3. *The Physics of the Expulsion of the Fœtus during Labour.*

1. *The Relation of Uterine Wall to Uterine Contents.*—The conditions of the uterine wall must be considered in frozen sections of the entire cadaver, as it is only by studying these that we can attain correct conceptions. This limits one, for pregnancy, to the sections of Braune and Waldeyer, where the entire cadaver was frozen, and the fœtus and other contents lifted out to display the uterine shape.

It will be found, then, that the uterine wall is passive, and is moulded to the contents by intra-abdominal pressure. The most striking proof of this is given in those cases where the liquor amnii is less abundant, and where the uterine wall accordingly follows more or less the outline of the fœtus. Thus Waldeyer figures a coronal section of an early pregnancy, where the uterus can be seen moulded on the leg of the fœtus; while in his drawing of the uterus in advanced pregnancy the uterine wall shows evidence of the pressure of the intestinal coils. In some drawings, such as that by Braune, the uterine wall is smooth in contour, but this merely indicates that the presence of liquor amnii in a certain amount prevents the uterus being moulded on the fœtus, and is in itself proof again of the moulding of the uterine wall on the uterine contents. Further, the posterior wall of the uterus shows evidence of plasticity, inasmuch as it is moulded to the irregularities of the spinal column. The full-time uterus is therefore a slackly-filled sac moulded on its contents by intra-abdominal pressure, and taking in certain cases an impression of its rigid surroundings. In a cast of the pregnant uterus of an ape I found the fœtus distinctly figured (*vide* Plate, p. 84).

2. *The Nature and Phases of Uterine Action.*—Hitherto our notions of this have been extremely crude, and obstetricians have not applied, as they might have done, certain well-known facts in regard to muscular action. In any good text-book of physiology it will be found that the muscular contraction is succeeded by a phase where the muscle resumes its former shape, which had been deformed by the contraction. This is due, according to the belief of most physiologists, to the elasticity of the muscle.

The following sentences from a well-known text-book of physiology put the matter briefly. Thus Foster says, "There appears to be a minute diminution of bulk, not amounting to more than one-thousandth." "The shortening, as we have seen, is followed by a relaxation, the muscle returning to its original length. This is brought about by the elastic reaction of the muscular substance itself" (p. 54, 3rd edit.). It may be said that this holds good for striped muscle only, but the same is the case in unstriped muscle. Helme, who investigated the action of the sheep's uterus, found that a contraction curve was made up of—

"(1.) The Contraction;
(2.) The Maintenance of Contraction;
(3.) The Relaxation;"

and says—

"The relaxation is probably due, therefore, to the muscular fibres themselves, either from elastic reaction or active contraction in another plane" (p. 82).

The uterine muscle, whether in a sheep's cornu or a woman's uterus, bounds a potential or an actual cavity filled with contents.

This cavity has a certain area, and during contraction this area is diminished, while during relaxation it is increased. Helme shows this graphically, and obtained tracings recording it. It is of special importance for us to understand this in the uterus immediately post-partum. We have then a thick-walled uterus with its characteristic division into retracting portion above the retraction-ring and flaccid thinner portion (lower uterine segment and cervix) below the ring. The retracting portion alone concerns us. Its potential cavity is practically two anterior and posterior triangular surfaces, apex downwards, always in contact. When a contraction comes on, these two have their superficial area diminished and practically slide on one another; when relaxation ensues, their superficial area increases again, the sliding motion occurs, and no hollow cavity is ever formed, although the walls may be separated by blood effusion.

In the uterus containing the child or placenta we get a filled cavity; the walls are separate, but the space between them always contains fluid, or fœtus, or placenta.

We must therefore in practical obstetrics, in an actual pain, distinguish—

(1.) *The Retraction;*
(2.) *The Relaxation due to Elastic Recoil of the Muscle.*

(1.) *The Retraction.*—This is more than a contraction, and indicates that in the relaxation the muscle does not resume its original condition, but retains a certain amount of its thickening, and diminution of bulk. Retraction is always accompanied by diminution in internal uterine area.

(2.) *The Relaxation due to Elastic Recoil of the Muscle.*—I only remark on this head that this phase of uterine action has been strangely neglected in obstetrics, and that it is accompanied by increase in internal uterine area. The uterus softens and becomes moulded or impressed, though slightly, by the surrounding organs.

3. *The Physics of the Expulsion of the Fœtus during Labour.*—At the beginning of labour we have the slack-walled uterus in the abdomen and moulded by intra-abdominal pressure on its contents, the fœtus and liquor amnii. The fundus uteri, on palpation, lies at the level of the margins of the ribs on the right side. The fœtus lies doubled up, head usually lowest, and so compacted, that from head to breech it measures half its length (Ahlfeld).

The well-known fœtal attitude is present,—*i.e.*, thighs flexed on abdomen, legs on thighs, feet on tibiæ; the arms are folded across the chest and the head bent forward on the sternum. It forms thus a compacted ovoid, with the breech touching the fundus and the head at the os internum.

When labour sets in, a very remarkable series of phenomena develops. Our knowledge of these is mainly due to an exceed-

ingly able paper by Schroeder and Stratz, now confirmed by the wonderful series of frozen sections of the various stages of labour we now possess. I must confess that I at one time felt sceptical and hostile to their views, but I am now convinced of their accuracy and the great ability of the clinical research.

Schroeder and Stratz showed that during labour the fundus uteri remained at nearly the same level as it did at the end of pregnancy. During the pains the uterus erects itself and passes forwards somewhat, but the fundus sinks only very slightly.

But, it may be urged, the child is descending; the fundus must sink in proportion. This is precisely where the point lies. It has been shown that during the pains the fœtus becomes elongated and straightened, and the original fœtal attitude undone by the legs being in part extended. The whole contents, fœtus and liquor amnii, are still accurately pressed upon, both during the pain and after it. At the end of the second stage, therefore, there is liquor amnii between the fœtus and fundus. This was observed clinically by Schroeder and Stratz, and confirmed by Barbour in his section of a woman who died when the fœtal head was on the perineum.

A still more remarkable fact is that during the third stage of labour the fundus remains high (provided the patient be chloroformed, so as to abolish intra-abdominal pressure) until the placenta is separated and expelled below the retraction-ring.

All these facts can be verified by palpation during labour, and the elongation of the fœtus can be ascertained by the use of callipers, one knob being placed on the child's head internally, the other on the breech externally. The measurement between fundus and symphysis is almost a fixed one during the first and second stages, viz., a little more than 24 cms.

In a recent paper Hoffheinz has confirmed these facts exactly.

But by abdominal palpation interesting points can be made out in regard to the uterus itself. One may map out the retraction-ring, the high position of the bladder, and the round ligament, the left usually.

We see, therefore, that the uterus during the first stage is mainly concerned with the canalization of the lower uterine segment, cervix, and pelvic floor; that during the second stage intra-abdominal pressure plays a very important part; that in the third stage intra-abdominal pressure is also a great factor in expelling the separated placenta. Thus far for the purely clinical features.

We must trace, however, more exactly what happens during the expulsion in relation to special points.

In the first stage it is during the pain that the uterus takes a definite shape, probably seen in one of Braune's Plates. As the result of the pain we get—(1), a redistribution of the uterine contents, the liquor amnii forming the fore-waters; (2), an elongation

of the fœtus and an undoing of the fœtal attitude, so that the fœtus becomes rudely quadrupedal, and finally almost fully straightened, as at the end of labour. This is very well shown by Barbour's cast.

When the pain dies off, the firm uterus relaxes, becoming applied to the uterine contents. We have here to consider how this happens. So far as the CONTENTS are concerned the fœtus retains in part the undoing of its attitude, while the liquor amnii becomes distributed into any chinks formed by the fœtus as the uterine compressive power is withdrawn. The liquor amnii is a perfect fluid, while the fœtus is semi-plastic, and therefore will respond more perfectly to negative pressure changes.

During the pain, as we have seen, the uterus takes a definite shape, but when the pain dies off and it becomes flaccid, we get intra-abdominal pressure moulding it again on its contents. The factors here are complex; and undoubtedly the elasticity of the canalized tissues, as well as the elasticity of the fœtal tissue itself, have a bearing not as yet fully grasped.

During this first-stage mechanism there is therefore a general contents pressure established in the fœtus and liquor amnii, but the contents are in the main elongated and therefore lower, as already explained, while the lower uterine segment has become completely, and the pelvic floor in part, canalized.

During the second stage the mechanism has several new features in it.

The uterus undoubtedly acts, but not normally, as a further canalizing agent. It establishes tension on the round ligaments and other under-supports of the uterus, and thus grasping the contents, forms, as it were, an ellipsoid for the intra-abdominal pressure to act on during the second stage.

Intra-abdominal pressure is undoubtedly the great factor of expulsion during the second stage. When by a pain the head is partially driven deeper into the pelvic cavity, strong reflex intra-abdominal pressure is set up, and the uterus and its contents subjected to a compression that depresses the presenting part markedly. This depression is due to elongation of the fœtus, to some slight depression of the uterus as a whole, and to an actual driving-on of the fœtus as a whole, owing to the presence of liquor amnii between the breech and fundus. The exact explanation of this last point is one of great interest. As a matter of fact, the onward progress of the fœtus is in part due to a relative displacement of the uterine contents,—the liquor amnii (in part) lying towards the end of labour where it did not lie at the beginning, viz., between the breech and fundus. How is this? It arises, I believe, as follows:—When what we term a second-stage pain comes on, the uterus retracts, and the presenting part becomes lower. This, however, is slight, as one notes specially when narcosis is too deep. In light anæsthesia, or without it, the

patient begins to strain, and we get great increase of the intra-abdominal pressure, due to the action of the diaphragm and abdominal muscles. The effect of this addition of intra-abdominal pressure is to cause, usually in a multipara, marked progress of the fœtus. When the pain dies off, the intra-abdominal pressure and intra-uterine pressure fall, the uterine capacity, as well as the purely intra-abdominal capacity, increases, and the upper portion of the fœtus and the liquor amnii responding to this (the head being more fixed), we get passage upwards of the limbs and liquor amnii. This becomes more marked the lower the head descends, as it then is more fixed, so that ultimately, at the very end of labour, we get the fœtus markedly straightened, the limbs more extended, and the bulk of the liquor amnii in the fundal region of the uterus. When the final pain comes on we get the expulsion of the fœtus, caused mainly by the intra-abdominal pressure markedly compressing the uterine contents, and by the effectual pressure, *inter alia*, of the upwardly-displaced liquor amnii. All must have noticed frequently the gush of water following the birth of the breech.

I may summarize this question as follows:—

*How is the child expelled from the uterus, the fundus remaining throughout at an almost constant level?*

FIRST STAGE.—*Power* here is uterus alone.

*Action.*—Canalization of lower uterine segment and cervical canal; elongation of fœtus and partial undoing of fœtal attitude; little actual descent of fœtus as a whole, but lowering of presenting part.

SECOND STAGE.

*Action of Uterus.*—This is slight, and consists in its establishing tension on round ligaments mainly, in the continued action of the circular fibres, and in forming with uterine contents a plastic mass to be compressed by intra-abdominal pressure.

*Intra-abdominal pressure* is main expulsive agent in second stage. By it we get—

(1.) Elongation and straightening of fœtus during the positive pressure.

(2.) Displacement upwards of limbs and of liquor amnii when the pressure falls.

(3.) Ultimate expulsion of fœtus by pressure on displaced fœtal limbs and liquor amnii.

The fundus thus remains practically unaltered in level.

The moulding of the fœtus causing its elongation is aided by the grip of the retraction-ring.

## Comparison of the Expulsive Phenomena proper to the Abdominal Cavity.

The expulsion of urine, of the rectal contents, and of the fœtus have all this in common, that the expelled mass is moulded, and that the expelling powers are an unstriped muscular organ, aided by intra-abdominal pressure.

In *Urination* we have relaxation of the urethra and expulsion of the markedly moulded stream of urine by vesical action and intra-abdominal pressure. The action of the bladder is put at a minimum by some, and is probably not so active as in the lower animals. The upright posture gives intra-abdominal pressure special advantages, and it is possible that in the evolution of this the bladder has lost some of its more active function.

In *Defæcation* the expulsive phenomenon is more complex. As already shown, when the fæcal semi-plastic unmoulded mass passes the sphincter tertius, we get uneasy sensations and necessity for expulsion. In this we get relaxation of the anus, a roofing-in of the lower rectal segment, either by the sphincter tertius or by mere mucous membrane apposition, so that we get a limited muscular expulsive organ formed, as it were. By the muscular contraction of this segment, but especially by intra-abdominal pressure, we get the fæcal mass driven out, elongated, and moulded by the anus into the characteristic healthy "stool."

Here the problem of expulsion is more complex than in urination, and less so than in the expulsion of the fœtus, inasmuch as the fæcal mass is discharged in segments.

In *Labour* we get a mechanism of expulsion quite analogous to that of defæcation. There is canalization of the lower segment, cervix, and pelvic floor, depression of the fœtus by its elongation and moulding, and finally its expulsion, mainly by intra-abdominal pressure. In labour, owing to the evident fact that the fœtus is discharged entire, we get a new phenomenon, viz., the relative displacement of uterine contents, so that the lower limbs are extended and the liquor amnii displaced up.

These three expulsive phenomena are thus quite analogous in their mechanism, and the mechanisms of defæcation and the expulsion of the fœtus are identical.

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*The President* had listened with great pleasure to the interesting paper which Dr Hart had brought before them, and in which he had so suggestively developed the analogy between the mode of evacuation of the gravid uterus and the evacuation of the neighbouring viscera. The only criticism he (the President) would offer was, that it seemed to him that Dr Hart had minimised the effect of the action of the uterus in promoting the progress of its own contents during the second stage. No doubt the accessory powers played a very important part in the expulsion of the fœtus, but

that the uterus could effect its expulsion without their aid was well known, as in cases of paralysis, and it was difficult to conceive that it did not play a main part in the extrusion of its contents under ordinary circumstances.

*Dr Berry Hart* replied.

## VII. A CASE OF SCARLET FEVER IN PREGNANCY, WITH INFECTION OF THE FŒTUS.

By J. W. Ballantyne, M.D., F.R.C.P. Ed., F.R.S.E., and David Milligan, M.B., C.M.

Scarlatina is an exanthem which is very rarely met with during pregnancy, and some authors have gone so far as to say that the gravid woman is protected from it; but in the case to be narrated, not only did the mother pass through an attack of scarlet fever, but the fœtus in utero likewise caught the infection.

Mrs S., a woman of between 20 and 21 years of age, was pregnant for the first time. She expected her confinement on or about the 21st of April (1893), and during the early part of her pregnancy she enjoyed good health. She had never had scarlet fever. During January and the early part of February, however, she was exposed to the contagion of scarlatina, and on February 7th she complained of slight sore throat. On February 8th Dr D. Milligan, who had been engaged to attend her at her confinement, was called to see her. He found her suffering from a sore throat, which was typically scarlatinal in character. There was an indefinite red rash over the chest and root of the neck; there was a characteristic scarlet fever tongue; and the temperature was 103° F. The provisional diagnosis of scarlatina was made, and salicylate of soda was given, but was almost immediately stopped on account of the headache caused, and quinine was substituted for it. On the morning of February 9th the temperature was 101°·2; the throat was still bad; the rash was now quite distinct, although not copious, and affected chiefly the chest and limbs, and the patient complained of obscure pains in the lower part of the abdomen. No vaginal examination was at this time made, as she had had a dose of cascara, and the abdominal pains were ascribed to its action. On February 10th, at 4 A.M., Dr Milligan was sent for, and he found on his arrival that labour had set in. The early stages were normal, but when the head reached the perineum delay occurred from weakness of the pains. Some ergot was given, but this having no effect, short forceps were applied, and the head was easily shelled out. There was no tear of the perineum, and gentle pressure served to expel the placenta; but there was considerable hæmorrhage, both at the time of its expulsion and immediately afterwards. The bleeding was easily stopped by compression of the uterus, and there was no need for the hot douche

that was being prepared. On the day after the confinement (February 11th) the mother's temperature was 101°·8, and her pulse 120; the lochial discharge was small in amount, but had no bad smell.

On February 12th Dr Ballantyne saw the case in consultation; the rash was still visible on the trunk and limbs, but was beginning to fade; the tongue was cleaning at the edges and tip, and the redness was disappearing on one side of the throat. The diagnosis of scarlatina was fully confirmed, and a guarded, but not hopeless, prognosis was given. The patient's husband was particularly anxious about her, for his first wife had died in childbed with her first child. The maternal temperature and pulse were as follows:—

| | Temperature: Morning. | Temperature: Evening. | Pulse. |
|---|---|---|---|
| Feb. 8, | 103° F. | | 120 |
| 9, | 101·2 | | 120 |
| 10, | not taken (labour) | | 120 |
| 11, | 101·8 | | 120 |
| 12, | 101·8 | 102°·8 F. | 118 |
| 13, | 102·4 | 102·6 | 112 |
| 14, | 102·2 | 101·2 | 112 |
| 15, | 100·2 | | 100 |
| 16, | 102·4 | | 100 |
| 17, | 100·2 | | 90 |
| 18, | 99·8 | | 88 |
| 19, | 99·8 | | 90 |
| 20, | 99·0 | | 85 |
| 21, | 98·4 | | 72 |

There was thus a gradual fall in the temperature, broken only by a slight rise on the sixth day of the puerperium, which was probably due to the commencement of the mammary secretion; and a steady slowing of the pulse-rate. On February 12th castor-oil was given, and the bowels moved four times on that day and thrice on the succeeding day; a dose of liquorice powder was necessary on February 24th. The urine was not examined, as it could not be obtained free from lochial discharge without the use of the catheter, and it was thought safest not to employ that means. The lochial discharge remained sweet throughout, so the antiseptic douche was not used. Desquamation began on February 16th, the ninth day after the sore throat began, and the sixth after the confinement; it pursued the usual course, and was specially marked on the hands. Dr Ballantyne saw the patient again on February 28th, when the desquamation was still going on. She is now convalescent.

Whilst scarlatiniform rashes in the puerperium have been comparatively often noted, cases of true scarlet fever in pregnancy are

uncommon occurrences. In this instance, as in most of those recorded by other observers, the appearance of the rash was soon followed by premature labour. The maternal mortality has been high in cases of scarlet fever in pregnancy, but in our case recovery took place.

Let us now turn to the condition of the infant. When born, the child, a female, showed all the signs of immaturity: it was small in size, and its nails were imperfectly developed. It was, however, born alive, and cried, although feebly. It was covered with a thick layer of vernix caseosa, and as there was no lard or fat in the house with which to remove this covering (through the premature occurrence of labour the necessary preparations for the confinement had not been made), the condition of the underlying skin was not ascertained on the day of birth. On the next day, however (February 11th), the nurse drew Dr Milligan's attention to what she described as an unusually marked eruption of the "red gum." She also told him that the infant could not swallow, and for the first few days of life the child only took a few drops of milk, and that with very evident suffering. The skin was hot to the touch.

On February 12th Dr Ballantyne saw the infant. It moaned at intervals, and was restless. The skin was red all over the body, but especially on the shoulders and thighs, and the redness was unlike the physiological erythema of the new-born. On drawing the finger along the skin over the shoulders a transient white line was left. There was some swelling of the glands at the angle of the jaw, and the interior of the mouth was redder and drier than is normal in the new-born infant. The tongue was bright red in colour, but had no white coating; the absence of the white covering may have been due to the fact that the infant was taking no food. The skin was somewhat hot to the touch. An attempt was made to take the temperature, but on introducing the thermometer into the rectum it evidently became embedded in meconium, for the index would not rise. The child would not allow the thermometer to remain in the mouth. During the next few days its condition improved; it slept almost continuously, like all immature infants; it moaned less, and took a few drops of milk without signs of suffering. The cord separated naturally in about a week. Desquamation of the cuticle began about the same date as in the mother, and when Dr Ballantyne again saw the child (February 28th), large flakes were separating from the hands, and finer scales from other parts of the body.

## Fœtal Scarlatina.

Scarlatina affecting the unborn infant is a condition that has been seldom recorded, and some writers (*e.g.*, W. C. Roberts[1] and

[1] Roberts, W. C., *Amer. Journ. of the Med. Sciences*, vol. xxvi. p. 371, 1839.

Parvin[1]) have gone so far as to say that it has never been met with; but we have been able to collect together fourteen cases in which the diagnosis of fœtal scarlet fever seems to have been well founded, and three others (Nos. 1, 4, and 9) in which it was somewhat doubtful. It is easy to understand how observers have found it difficult to make sure of the existence of this fever in the new-born infant, for several of its distinctive characters are normally present in the child at or soon after birth. Thus, there is a normal redness of the skin, popularly known as the red gum; when this passes off, it is succeeded by exfoliation of the cuticle; and, again, the interior of the mouth in the new-born infant is usually redder and more dry than in older children. Further, the cutaneous redness and the epidermal exfoliation are always specially marked in infants born prematurely, and these facts make the diagnosis of fœtal scarlatina still more difficult, for many of the infants in which this fever was thought to be present have been immature. Nevertheless, a study of the clinical records of many of the recorded cases warrants the belief that they were really examples of fœtal scarlatina, as will be shown immediately.

*Historical Notes.*—According to L. Thomas, Baillou (Ballonius) was the first to note the existence of fœtal scarlet fever; but the passage referred to does not seem to make this clear. The quotation is as follows:—" Uxor Bodini septimestrem partum excussit vi morbi, eodem modo maculatum (erat enim febris cum rubeolis) quo et mater."[2] Thomas goes on to refer to cases reported by Ferrario, Tourtual, Gregory, Stiebel, and Hüter, which seem to have been true instances of intra-uterine scarlatina; and he notes also the observations of Asmus and Meynet, in which some doubt as to the diagnosis exists. The instances put on record by Williams, Leale, Dwyer, Thorburn, Saffin, Holsburg, Dorsett, and Cordes may be enumerated as genuine examples of scarlet fever acquired by the fœtus in utero.

*Clinical Details:* 1. *Maternal.*—In most of the cases of fœtal scarlatina the mother was also affected at the same time; but in Nos. 3 and 17 it would appear that she escaped. It is probable that in most instances the mother had never before suffered from the exanthem; but Nos. 10 and 14 were exceptional in this respect, for in them the mother had had scarlet fever previously, and took it a second time when pregnant. The mothers were usually multiparous (Nos. 3, 4, 8, 9, 10, 11, and 14), but in our case she was a primipara. A distinct source of infection was nearly always traced, and with regard to the multiparous women this was generally found in the occurrence of scarlet fever in some of the older children (*e.g.*, Nos. 3, 4, 8, 9, 10, and 14). In two cases (Nos. 3 and 9) the woman had nursed her husband as well as her children through attacks of scarlet fever. In other instances (Nos. 11 and

[1] Parvin, T., *Amer. Med. Assoc. Journal*, April 12, 1884.
[2] *Vide* Schurig's *Embryologia historico-medica*, p. 192, 1732.

18) the infection was brought into the house by a visitor or caught by the mother when visiting in an infected house; whilst in No. 5 the disease was epidemic at the time, and in No. 6 puerperal fever was raging.

It is a noteworthy fact that in all the cases the mother was well advanced in pregnancy when she was attacked with scarlatina, and in consequence of this most of the infants were born at the full term, or nearly so (Nos. 3, 4, 6, 7, 9, 10, 11, 14, and 17). In Nos. 1 and 8, however, the child was born at the seventh month, and in our own case (No. 18) the pregnancy, according to the patient's reckoning, had not quite reached that date. The confinement seems usually to have occurred soon after the appearance of the rash (Nos. 7, 8, 11, 14, and 18), but in some instances delivery did not take place for a week or two (Nos. 3 and 10). In the last-mentioned cases the child was born with desquamation going on. The history in No. 13 was interesting, as the mother was exposed to the contagion about a fortnight before delivery, and took the fever about a fortnight afterwards, so that the author (Thorburn) says,—"I can hardly resist the conclusion that the fœtus received the poison and suffered its primary effects whilst yet unborn, the mother being then insusceptible, and that she afterwards, owing to the puerperal weakness, became susceptible, and was infected by her own offspring."

In three out of the eighteen cases (Nos. 6, 11, and 12) it is definitely stated that the mother died, in seven (Nos. 3, 8, 10, 13, 14, 17, and 18) her recovery is noted, and it may be taken for granted that in the remaining eight the issue was also favourable. In No. 6 death occurred four days after delivery from metrophlebitis: in No. 11 the fever was grave in type from the first, and the patient was delirious during labour; her condition improved during the first twenty-four hours after delivery, but thereafter the temperature rose, the rash became purple, and death occurred on the third day of the puerperium: and in No. 12 the mother died in an eclamptic seizure at the moment of delivery.

2. *Infantile.*—In all the cases recorded it would appear that the infant was born alive; in fact, it is necessary for diagnostic purposes that the child be living; a dead-born fœtus may or may not have had scarlatina—it is impossible to tell. In three instances (Nos. 5, 8, and 10) the infant died: in the first on the eighth day of life, in the second on the second day, and in the third at the end of a month (from erysipelas and abscesses). It is probable that in all the other cases the child lived; it is definitely stated that such was the result in Nos. 3, 4, 9, 11, 13, 14, and 18. Most of the infants were born in the eruptive stage of scarlatina; thus the rash was visible in Nos. 1, 2, 3, 6, 7, 8, 9, 11, 12, 14, 17, and 18; but in Nos. 4, 10, and 13 desquamation was going on at the time of birth, and on this account the diagnosis must remain doubtful in these cases, although it is noteworthy that in No. 13 suppuration of the cervical glands and albuminuria followed the exfoliation of

the cuticle. In No. 5 there was neither rash nor desquamation, and the author (Gregory) founded his diagnosis of scarlatina upon the following facts:—Scarlet fever was epidemic at the time; the infant was evidently suffering from some kind of fever, and there was marked angina maligna. In several cases in which the eruption was present at birth the stage of desquamation was reached at a later date: on the ninth day in No. 3, on the tenth in No. 11, on the fifth in No. 14, and on the sixth day of life in No. 18. In No. 9 it is distinctly stated that the eruption was not followed by desquamation, a fact which caused Thomas to doubt the diagnosis; on the other hand, there were noted fever, sore throat, and difficulty in swallowing, circumstances which supported its accuracy. In several of the cases (Nos, 3, 7, 9, 11, and 18) difficulty in deglutition was a symptom early noticed; in others (Nos. 9, 11, 14, and 18) the feverish state was observed; and in yet others (Nos. 5, 9, 11, 17, and 18) sore throat was recorded. In Leale's case (No. 11), which is one of the best reported, the existence of congenital scarlatina was abundantly proved; there was the characteristic rash, followed by desquamation, the difficulty in swallowing, the typical sore throat and tongue, the rise in temperature, and later there followed nephritis and dropsy.

When a pregnant woman takes scarlet fever, the fœtus in utero is not always affected; thus, Louis Thomas reports three cases in which the children escaped (two from Murchison, and one from Elsässer), and the same thing has been occasionally noted by other observers. It would be interesting in such cases to discover whether the child that was immune in utero and at birth remained so in after life.

### *General Conclusions.*

1. When scarlatina occurs in pregnancy the fœtus in utero is usually, but not invariably, affected.

2. It would seem that the infection of mother and fœtus is practically simultaneous, for the infant at birth shows the fever in the same stage as that reached in the mother, and desquamation usually occurs at the same time in both.

*Note.*—Dr Ballantyne has come to the same conclusion with regard to fœtal measles; *vide* paper in *Archives of Pediatrics*, April 1893.

3. The clinical features of scarlatina in the fœtus and new-born are the same as in later life; but the diagnosis is rendered difficult by the resemblance these symptoms bear to the normal conditions (erythema, desquamation, etc.) met with in the neo-natal state.

4. The prognosis as regards both mother and fœtus is grave, but death does not invariably occur. The supervention of septicæmia is the greatest danger, and the chief treatment should be its prevention.

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## MEETING VI.—MAY 10, 1893.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr James Carmichael* showed the HEART OF A CHILD WITH CONGENITAL MALFORMATION. The heart in the recent state exhibited the following appearances:—It was of a dark red colour. The right ventricle was much enlarged, forming most of the apex of the organ. The appendix of the left auricle projected unusually far forward in front of the pulmonary artery. The pulmonary

artery was dilated. The pulmonary valve was normal; the conus arteriosus beneath showed remarkable hypertrophy. The aorta was somewhat large in its ascending portion, the innominate and left carotid coming off within one-eighth of an inch of each other, one-quarter of an inch further on another minute branch, and one-eighth of an inch further still, the left subclavian. Beyond the subclavian the aorta took a sharp V-shaped bend downwards, and into the apex of the V a patent ductus arteriosus entered. Beyond the second limb of the V the aorta appeared of normal diameter. The left auricle was dilated. Its cavity would have held a bantam's egg. The pulmonary veins ended within the lung, the auricular cavity having extended back to the lung. The foramen ovale was closed. The walls of the left ventricle were thickened, the cavity being slightly less than normal in size. The mitral orifice was almost completely stenosed, the chordæ tendineæ and valve segments being so fused together as to leave only three minute orifices big enough to allow the passage of a probe, the only passages for the blood to flow through. The aortic valve appeared normal. The right ventricle was much hypertrophied, and the cavity dilated. The tricuspid valve was normal. Intra-ventricular septum quite closed. Right auricle dilated, but its walls not thickened. The child was a girl three years old. Clinically she presented a typical picture of cyanosis. The history showed that at birth the child appeared to be healthy, and passed through the lactating period without any ailment. When about a year old she began occasionally to suffer from fits of dyspnœa. On examination of the heart the precordia showed some bulging; the apex beat was in the fifth interspace, just internal to the vertical line of the nipple. Percussion showed a normal area of dulness. On auscultation the sounds were loud and distinct, following one another with more than usual rapidity, the long pause being correspondingly lengthened. No murmur was at any time audible. There was marked reduplication of both sounds in all the areas. The pulse was abnormally frequent, generally about 100, and somewhat irregular; the radial, posterior tibial, and brachial pulses were imperceptible; those of the larger arteries could be made out with sufficient distinctness.

II. *The President* showed A DOUBLE OVARIAN TUMOUR from a patient who had been sent to the Infirmary by Dr Braidwood of Halkirk, suffering from tumours of the ovaries, complicated with cancer of the liver. The following are the ward notes of the case:—Mrs G., æt. 51, Caithness. Patient admitted 9th March 1893, complaining of pain in back and swelling of abdomen. Her trouble, she states, began ten weeks ago with stabbing pains in left iliac region, and about five weeks after this she noticed the abdomen begin to swell and increase rapidly in size. She called in Dr Braidwood, who on four occasions tapped, and removed about 70

ounces each time. During the last few weeks patient has got much thinner, and has been reduced in strength. Her previous health had always been good, except for occasional severe pains in the epigastric and right hypochondriac regions. Her sexual history shows menstruation began at age of 14, was of twenty-eight-day type and seven days' duration, the amount being rather free. It was regular till August 1892, when it began to vary somewhat. She has always suffered from dysmenorrhœa and tendency to menorrhagia. She has had thirteen pregnancies, first thirty-one years ago, the last five years ago. Three of them ended as miscarriages. Labours were easy, and puerperia normal. Patient is tall and well-formed, but much emaciated. Mammæ are markedly parous, but no secretion is obtainable. Abdomen is greatly enlarged by a tumour extending to the ensiform cartilage, and lying chiefly to the right side. There is much tenderness all over the abdomen, and fluctuation is easily obtained. *14th March* 1893.—Patient anæsthetised and laparotomy performed. Double compound cystic ovarian tumour was removed. Both tumours showed many adhesions. There were also seen to be carcinomatous nodules in the liver. Notwithstanding this, patient made an excellent recovery, and was dismissed in the end of April, much improved in general health. On examination during life a nodulated condition was felt in connexion with the lowest portion of the tumour. This was thought to be due to a malignant condition, but no such change was found after the tumours were removed, the nodules being organised blood-clots and small cysts in the tumour wall.

III. *The President* showed A CYSTIC SWELLING from the hind head of an infant, which had been sent by Dr Inglis of Stratford. The mother had had five children previously, all healthy and well formed. The child had presented normally, but there was considerable difficulty experienced in extracting the body, as the tumour, which was larger than the head, caused delay. Two days after birth, Dr Inglis amputated the tumour, which showed on its surface its relation with the hairy scalp, and the child had made a good recovery.

IV. *Dr J. C. Webster* showed—(*a.*) THE REMAINS OF A FŒTUS, removed by Dr Frederick Mann of Ashton-under-Lyne, from an extra-uterine gestation sac, opened through the vagina. A complete decidual cast of the uterine cavity from the same case was also shown. (*b.*) A FIBROID POLYPUS, FŒTUS, and PORTIONS OF PLACENTA from a case of placenta prævia. The patient was admitted to Ward XXIV. in April, when Dr Webster was acting for the house-physician. She complained of hæmorrhage from the vagina, which had lasted almost continuously for four or five weeks. She was very anæmic, and did not suspect she was pregnant. She was put to bed on her admission,—a large fibroid polypus, the size of a goose-egg, having been found in the vagina,

passing up into the uterus. In the evening labour pains came on, a three months' fœtus being born, and the polypus being partly extruded through the vulva. On being called to her, Dr Webster found her almost pulseless, a large amount of blood having been lost. The placenta was undetached, and was found to be prævia, being situated on the anterior uterine wall, its lower edge being at the *os internum*, about the level of the attachment of the tumour. The latter was removed by ligation of its pedicle. The placenta was next removed with the curette, because there was no time, on account of the patient's weak state, to dilate the cervix sufficiently to allow of removal by the fingers. The cavity was then swabbed with perchloride of iron solution, washed out, and then packed, along with the vagina, with iodoform gauze. The plug was removed on the third day, and the vagina douched with an antiseptic solution daily afterwards. The patient has made a good recovery.

V. *Dr Matheson Cullen* showed, for *Dr Wm. Wood*, a DOUBLE ADHERENT PLACENTA. Notes of Case:—Mrs C., a multipara, aged 35, gave birth to male twins on March 26th. She had had six previous children. The labour in this, her seventh pregnancy, was followed by severe post-partum hæmorrhage, with adherent placenta and well-marked hour-glass contraction of the uterus. *History.*—The patient was married in 1879, being then 21 years of age. Previous to the confinement under consideration she had given birth to six children, each of whom was born at regular intervals of 18 months. Two days after her marriage she gave birth to a premature child, a girl, certified as being of the seventh month. This child died of convulsions when 11 months old. The second child was also a girl, the labour being quite normal. The third child, likewise a girl, was supposed to be born about the eighth month of gestation, the labour being brought on as the result of a fall to the mother. The child died shortly after birth. This labour was remarkable for the excessive post-partum hæmorrhage, which nearly proved fatal. The doctor in attendance warned her as to the danger of having any more children. The fourth, fifth, and sixth children were all boys, and were born at full time, the placenta being adherent in each instance and having to be removed in pieces, severe post-partum hæmorrhage following. The fourth child, it might be mentioned, was delivered under chloroform and with forceps. The seventh confinement (the one now under consideration) occurred three years after birth of No. 6. This was a case of twins,—the first child, a vertex presentation, being delivered in the usual way; while the second one, born after an interval of twenty minutes, was a breech case. About five minutes after the birth of the second child the student and nurse in attendance noticed a sudden gush of blood,—the bedclothes, the bed, and even the floor being deluged with blood. This made the patient very nervous and exhausted. The student in charge having sent a messenger for me, administered to the patient thirty

minims of spiritus ammoniæ aromaticus, and endeavoured to restrain the bleeding by firm pressure on the uterus through the abdominal wall. On my arrival, a few minutes afterwards, I found the patient suffering from severe exhaustion, the pulse being quite imperceptible at the wrist. The patient expressed a feeling of great faintness, which was followed by syncope. The skin was cold, and covered with profuse perspiration. On placing the hand on the abdomen the uterus was felt to be irregularly contracted, and larger than normal. I therefore placed the patient across the bed, and, following up the cord, introduced my hand through the cervical canal, and there felt the closed os internum with the umbilical cord passing through it. By gentle and continuous pressure of the fingers passed within the constriction, and by the uterus being supported from without, the hæmorrhage was controlled, and in about ten minutes the spasm was sufficiently relaxed to admit of the passage of my hand. Following up the cord to the site of attachment of the placenta, I gently insinuated my fingers between the edge of the placenta and the uterine wall, and in this way succeeded in peeling off and removing the placenta. That placenta is now before you. After removal of the placenta I re-introduced my hand into the uterus, but failed to make out any further adhesions. During the time the placenta was being detached the hæmorrhage was very slight indeed. This may probably be accounted for by the extreme exhaustion of the mother. I now gave an inter-uterine douche of corrosive sublimate (1 in 2000) at a temperature of about 120° F. This, together with a hypodermic injection of ergotin, stimulated the uterus to contract, and the bleeding ceased. The patient's condition was now one of extreme collapse. Hot-water bottles were applied to the feet, the foot of the bed raised, and a hypodermic injection of ether was administered, this being followed in twenty minutes by a warm enema, consisting of three ounces of brandy. Consciousness gradually returned. The patient was then fed with strong beef essence, warm brandy and water, milk and egg, getting small quantities alternately every thirty minutes. The stage of reaction was treated most successfully by suppositories of morphine. The woman made a good recovery. She was able to sit up for a short time on the twelfth day, and now she and the twins are doing well. In conclusion, gentlemen, I must state that, so far as I was able to make out from the patient's history, there was no specific element to account for the cause of the adhesions, and I think the case is one of interest, from the fact that after the premature birth of the third child, which was the result of a fall, each succeeding labour has been accompanied by an adhesion of the placenta and post-partum hæmorrhage. I may also state another remarkable fact—namely, that out of over 1000 cases of midwifery which I have had under my charge, this is the first case of adhesion of the placenta I have met with.

## VI. PROLAPSE OF THE FEMALE URETHRA.

By Prof. A. R. SIMPSON, President of the Royal College of Physicians, and of the Obstetrical Society of Edinburgh.

DURING the past session two cases of prolapse of the urethra in the female have come under observation in the Buchanan Ward. The condition is not of frequent occurrence, and has received rather scant notice in gynecological text-books. I have thought it well, therefore, to bring the cases before the Society, as they have been recorded in the Ward Journal by Dr Lawson Dick, Buchanan Scholar. For the examination of the preparations and description of the microscopical appearances I have to thank my assistant, Dr J. C. Webster.

"Mrs R., æt. 52. Sent in by Dr Gray of Dundee. Admitted 17th November 1892, complaining of tumour at orifice of urethra. In her history she states she reached the menopause ten years ago, and had no discharge till within a fortnight ago, when, as the result of a fall from a chair, she had a rather smart hæmorrhage. On calling in her doctor he informed her of the presence of a urethral tumour.

"Before this, patient had hardly ever known a day's illness. She is mother of a family of six, all of whom are alive and well.

"Patient is a stout, healthy-looking female. Mammæ and abdomen show marked signs of multiparity, and abdominal palpation is negative. On inspection of pudenda a red vascular tumour, with smooth unbroken surface, is seen surrounding the urethral orifice. When manipulated it is not at all tender. Further examination reveals the ordinary senile changes, and that the body of the uterus is lying to the front, freely movable, and not at all enlarged.

"*November* 24, 1892.—Patient anæsthetised, and prolapsed mucosa of urethra was removed by cautery. Patient rapidly recovered, and was dismissed on 1st December, the part being well healed, and the cicatrix having puckered well in."

"The removed portion consists of a complete ring of the prolapsed urethra, ovoid in shape, about ¾ inch long and ½ inch wide.

"The urethral mucosa is irregularly folded, somewhat hypertrophied, and varying in thickness at different parts.

"On microscopic examination the epithelium is seen to be entirely transitional. Under the general surface spaces lined with this epithelium are seen; they are sections of deep recesses in the mucosa.

"The sub-mucous tissue is denser than normal. In several places connective tissue proliferation and leucocyte exudation around the vessels are seen.

"Extreme vascularity characterises the connective tissue. The capillaries are dilated and new ones seem to be forming in several parts. Blood is also effused everywhere in large or small quantities outside the vessels. In the largest effusion exudation fibrin-formation is seen in progress.

"The small arterioles are also somewhat dilated. Their endothelium, as well as that in the capillaries, is swollen in different parts, and some cells are seen in active division.

"Several of the vessels show considerable thickening and increased density of the connective tissue outside the endothelium."

"Mrs M., æt. 72. Sent in by Dr M'Ewan of Prestonpans. Patient was admitted to Ward 24 on 8th March 1893, complaining of pain on passing water. This had lasted for a fortnight previous to admission. The history is that for some twenty years past she has suffered from occasional dysuria, and when going about she also had bearing-down feelings and discomfort, which she attributed to coming-down of the womb. Till within a fortnight ago, however, her health had always been excellent; but at that time, quite unexpectedly, blood began to flow from the pudenda. This was so free that she had to call in her doctor, who informed her of the presence of a urethral tumour, and recommended her for admission.

"Sexual history shows nothing noteworthy. She has had five children and one miscarriage. Labours were easy and puerperia normal. She reached the menopause at the age of 52, the period from which she dates her trouble.

"On physical examination patient is seen to be healthy and fairly well nourished. Mammæ and abdomen show usual signs of multiparity. On inspecting pudenda a large vascular growth, considerably larger than a cherry, is seen at the base of the vestibule. There are sloughy, gray-looking patches on the surface. Round the attached base of the tumour the urethral mucous membrane is found to be everted, the orifice itself being found to lie on the anterior aspect of the tumour. On palpation there is no marked tenderness. Further examination reveals well-marked senile changes in the vagina, whilst the body of the uterus itself is found lying to the back, somewhat atrophied.

"*March* 9, 1893.—Patient was anæsthetised, and the tumour, with the displaced fold of urethral mucous membrane, was removed by a Paquelin cautery. A pad was placed against urethral orifice.

"*March* 18, 1893.—Patient dismissed cured."

"The amount of prolapse is small. The characteristics presented by it are very similar to those shown in the other specimen.

"The caruncle is about the size of a marble. It consists of connective tissue in which are blood-spaces of various sizes, some of which are dilated capillaries, and others mere effusions in the connective tissue. In small quantities blood is, as well, scattered

throughout the entire mass. In various parts the effused blood is in a state of organisation. Around many of the vessels is seen leucocyte exudation and connective tissue proliferation.

"On the outer surface of the greater part of the caruncle is squamous epithelium. A small portion is covered by the prolapsed urethral mucosa, consisting of transitional epithelium."

Although, as I have hinted, this subject has been somewhat overlooked by systematic writers, it has been dealt with by Winckel in his treatise on *Diseases of the Female Urethra and Bladder*,[1] and more recently Prof. Kleinwächter of Czernowitz has drawn attention to it in an exhaustive essay,[2] which gives a summary of recorded cases, and discusses their pathology, symptoms, and treatment.

## PATHOLOGY.

Kleinwächter has found records of 50 distinct cases, besides notices of others that bring the number up to about 100. Of 39 where the ages were given, he finds 20, = 51·08 per cent., occurring in children under 15 years of age; 7, = 17·90 per cent., during the reproductive age from 22 to 37 years; and 12, = 31·02 per cent., in elderly women beyond the menopause, from the 47th to the 75th year of life. Perhaps this tendency to greater frequency among children than among women during their reproductive or later years may account to some extent for the scanty attention that has been given to this complaint, for the greater number of them will come under the observation of the general practitioner or of the surgeon, rather than of the gynecologist.

Kleinwächter describes two different varieties of urethral prolapse, according as the inversion of the mucous membrane begins —1, immediately within the urethral opening; or, 2, higher up in the canal.

1. In the former case, where the inversion begins with eversion of the mucous membrane bordering on the meatus, we have the condition to which he thinks the designation of *prolapsus urethræ* ought strictly to be confined.

2. He applies Winckel's designation of *inversio cum prolapsu mucosæ urethræ* to the second group of cases. In these the mucous membrane becomes loosened from its subjacent tissue higher up in the canal, and may have to travel some distance in its inverted condition before the summit of the fold appears at the orifice and a definite prolapse occurs. According to him, the distinction between the two varieties is of importance in relation to the kind of operation likeliest to give satisfactory results in the different varieties.

[1] In Billroth and Luecke's *Handbuch der Frauenkrankheiten*, iii. 366.

[2] "Der Prolaps der weiblichen Urethra," *Zeitschrift für Geburtshülfe und Gynækologie*, xxii. 40, 1891.

The cases I have brought forward now are both instances of true prolapse, the inversion having begun in both at the lower limit of the canal. In the first there was no notable change in the tissues of the pelvis to account for the production of the prolapse. There were only the usual senescent changes, and these have sometimes been supposed to bring about a relaxation favourable to the occurrence of the displacement. But there was absence of any of the unhealthy discharges, or other pathological products or processes, such as cystitis, calculus, etc., that in some cases were cited as the causes of the mischief. It seems in this instance to have been produced quite suddenly, as the result of the fall the patient sustained when in stepping from the window-sill to a chair her foot slipped and she fell on the floor. The inversion affected the whole circumference of the canal equally at the sides, in front, and behind.

In our second case, though the mucosa was inverted all round, the posterior wall had undergone the greatest degree of displacement, and the cause of the prolapse was evidently the presence of the urethral caruncle. This was of the size of a cherry, and had a broad attachment, so that at first sight it appeared as if the red mass, composed of caruncle and everted mucosa, formed a single tumour; and it was only after some careful manipulation and the use of the sound that the actual relation of the structure was recognised. It is easy to understand that the presence of such growths should have been found accountable for the production of the prolapse in some of the recorded cases; and in other cases of urethral caruncle I have observed some degree of eversion of the mucosa, though this is the first, so far as I remember, in which it was so well marked.

## Symptoms and Diagnosis.

In some instances prolapse of the urethral mucosa gives rise to little or no trouble, and it may be that, especially in elderly women, the absence of any distinct distress leads to their passing unnoticed or unrecorded. The symptoms that call attention to the condition are pain in the seat of displacement, aggravated by exercise or by evacuation of the bladder. Sometimes there is difficulty of micturition as well as pain with the effort. Or bleeding, even profuse or repeated, may lead the patient to seek for advice. In other cases the presence of a painless but unusual structure is observed by the patient, who thinks she is the subject of some kind of tumour.

The diagnosis is made by inspection of the pudenda. A cherry-red growth is seen projecting from the urethra. Sometimes it has become œdematous and more pale; sometimes it is more congested and purple. It may even be gangrenescent, or show erosions or ulcerations on the surface. In some cases of old standing the surface takes on an epidermic character. The protruded mass

varies in size from that of a bean to that of a walnut, or even of a hen's egg. In some it is sensitive to the touch, but not in all. It may be seen to be due to a displacement of the whole circle of the mucosa, or it may be partial. Kleinwächter notes that in 34 cases the prolapse was complete in 24, and partial in 10. In the partial cases it may either be the anterior, or posterior, or a lateral wall that protrudes. The full exploration requires the introduction of the sound or catheter, which has to be passed in with care, where the mucous membrane is very sensitive or has become swollen or gangrenous, or where the displacement is complicated with the presence of growths, such as the urethral caruncle.

## Prognosis.

In some cases where the prolapse has been replaced, and the patient kept for a time at rest, and warned against making any exertion which would involve straining of the abdominal muscles, the displacement has not reappeared. But in most cases it is reproduced. In some the attempt at reduction of the displacement fails. Though in some of these the prolapse gives no further trouble, in others it goes on increasing in extent, and may become the seat of œdematous, inflammatory, ulcerative, or gangrenous changes which add to the patient's distress, and even develop elements of danger.

## Treatment.

If reposition of the displaced structures can be carried out, yet, as we have just seen, something additional will usually be required if the displacement is to be hindered from recurring. Sometimes packing of the vagina has been employed; sometimes a catheter has been kept in the bladder for a time. Again, astringents have been applied, or caustics, or the mucous membrane has been partially cauterized. Occasionally a cure has been effected by cutting out wedge-shaped portions of the displaced tissue; and Benicke[1] succeeded in one case by constricting the urethral orifice in its lower third with a catgut thread, and touching the lower part of the urethra some days later with a 2 per cent. solution of nitrate of silver. In the most pronounced cases, however, such expedients are, for the most part, unsatisfactory, and the distinct indication is given for removal of the displaced tissues. There are three different methods that have been adopted for effecting the removal:—

1. *Use of the Ligature.*—The structures to be removed may be made to slough off by strangling them with a ligature round a catheter passed through the canal. But although this procedure has been adopted even in some recent cases, it does not commend itself to the present-day surgery. As Kleinwächter points out, it contradicts all the conditions of aseptic surgery, is a cause of great

[1] *Zeitschrift für Geburtshülfe und Gynäkologie*, xix. 305, 1890.

and prolonged pain and discomfort, and implies a protracted cure. An improvement on this method of using the ligature is that adopted by Gaillard Thomas,[1] who "in one case drew down the prolapsed tissue, passed a silk ligature through its base, and tied the two halves."

2. *Use of Knife or Scissors.*—It is better to remove the inverted tissues at once with the patient anæsthetised. Thus they may be cut off with a bistoury, or clipped off with a pair of scissors. In this case the operator must be prepared at once to bring the edges of the wound together with sutures running in the course of the canal. It was in this way that Benicke, *e.g.*, effected a cure in his third case; and in two cases recorded by Munde,[2] one of which occurred in an old woman of 75, the other in a girl of 9. Munde drew out the protrusion with a tenaculum, and after trimming it with scissors close to the edge of the meatus, stitched the edge of the urethral mucous membrane to the vestibular mucosa by a running suture of fine catgut, with the result that union by the first intention followed, and the patients were speedily cured. Kleinwächter maintains that in the variety described as Inversion with prolapse of the urethral mucosa, excision is the only safe way of dealing with the case, and that it may be necessary first to split up the urethra to get full access to the inverted fold. When the inverted portion has been cut off and its base sutured, the wound in the urethral wall is easily closed. This operation would seem to me preferable to Emmet's[3] proposal to make a button-hole opening in the urethra, so as to get at the redundant mucosa, notwithstanding that he has himself reported good results from the procedure, and that it is endorsed both by Thomas and by Baker.[4]

3. *Use of the Thermo-Cautery.*—I am not convinced, however, that even in the variety referred to the removal of the redundant tissue could not best be effected with the Paquelin knife. The alleged danger of undue contraction resulting from the employment of the Paquelin cautery or the galvano-caustic wire is very much hypothetical. I have so often recognised the ease and safety with which urethral caruncles can be removed with the cautery knife when the entire circle of the mucosa might be removed without any consecutive stricture, that in both of the cases I have recorded I had no hesitation in making use of it for amputation of the prolapsed tissues. The operation was easy, the recovery speedy, and the results have left nothing to be desired.

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*Dr J. W. Ballantyne* thought that the Fellows were much indebted to the President for the two eminently practical and

[1] *Diseases of Women*, 4th edition, p. 120.
[2] *The American Journal of Obstetrics*, xxiii. 615, 1890.
[3] *Principles and Practice of Gynecology*, 3rd ed., p. 752.
[4] "Diseases of the Bladder and Urethra," in Mann's *System of Gynecology*, ii. 484.

exceedingly valuable papers that he had given them this session. His suggestive paper on the use of glycerine injections in labour would no doubt yield immediate good results in the practice of many busy obstetricians, and the contribution of the evening would stimulate all gynecologists to look for and treat the condition which had been named prolapse of the urethra. Dr Ballantyne had not, so far as he was aware, come across this condition in the adult female, but he had seen a somewhat analogous condition in some new-born infants; in them there appeared to be a redundancy of the urethral mucosa, which at first sight suggested to his mind a trifling degree of epi- or hypospadias, and which disappeared spontaneously. He would like to ask the President whether he had noticed dilatation of the urethra in either of his cases, for Skene had pointed out the frequent association of dilatation of the middle third of the urethra with prolapse of its mucous membrane. He would also like to ask what was the explanation of the thickening of the submucosa which had been described, for in order to understand how the condition of prolapsus arose it seemed to be necessary to believe that there was some looseness of this layer permitting displacement.

*Dr J. C. Webster* had carefully examined the specimens, and found that they presented some points of much interest. In the first place, the prolapsed portion of the urethra was covered with a well-marked and folded layer of transitional epithelium. It is usually taught, and in most cases it appears to be true, that the lower end of the urethra is lined with stratified squamous epithelium. Here it would appear that there might have been an extension downwards of the upper urethral transitional epithelium, and the analogy suggested itself of the extension downward of the epithelium lining the cervix displacing the squamous covering of the vaginal surface of the cervix in cases of catarrhal patch. In the case of the urethra the submucous tissues showed also inflammatory changes like those found in endocervicitis. The condition described as prolapse might not be a mere mechanical prolapse, but a hyperplastic downward growth of the urethral mucosa. In the next place, the structure of the submucous tissue exactly resembled that of a caruncle. Where both prolapse and caruncle existed together, it was impossible by the microscope to tell any difference between them. The origin of caruncle should be carefully studied. It was possible that it might be a localized extension, very marked in degree, of the condition now described as prolapsus of the urethra. The naked-eye examination of caruncles of various sizes pointed strongly in favour of this relationship.

*Dr Church* thought that the dysuria which so many old women complained of might, in some cases, be due to partial prolapse of the urethra. With a general atony of the muscular system there would be also a loss of contractile power in the *constrictor urethræ*,

and consequently there would be permitted a protrusion of the mucous membrane immediately above the constrictor, which would become more vascular and irritable. After each act of micturition there would occur a reduction of the prolapse which the effort occasioned.

*The President* thought Dr Church's suggestion was very feasible, and it would be desirable in all cases of dysuria in elderly women to make careful examination of the urethra. With regard to the pathological change of the mucous membrane in this condition, it would be of interest to repeat such observations as Dr Webster had made in the cases under discussion. It had seemed to him (the President) that to the naked eye the change in the displaced urethral mucosa resembled that which was to be found in other displaced and exposed mucous membranes. Mucous membranes that were normally in contact with other surfaces were ordinarily not specially vascular,—at the most rosy red. The palpebral conjunctiva, *e.g.*, was not notably red; but let ectropion exist for a short period, and the exposed conjunctiva became extremely hyperæmic. So the uterine mucosa, except at menstrual periods, was relatively pale; let the uterus become inverted, and the redness of the mucosa in the vaginal cavity helped to distinguish the inverted uterus from a polypus. The vesical mucous membrane, as seen through the cystoscope, looked yellow rather than red; let the bladder project for a time into the vagina through a fistulous aperture, or be observed in a case of extroversion, and the exposed portion was seen to be red as a cherry. So with lacerations of the cervix, leading to ectropion, in which the vascularity of cervical endometritis became apparent. The same thing was seen in the rectum. If the rectal canal was examined in cases free from piles, fissures, etc., it would be found to be pale; but if it became prolapsed it became persistently vascular. The nature of the change, and the cause of it, in all these parallel cases, were well worthy of investigation. As regarded the designation which had usually been applied to the condition, it was probably adopted from the habit of speaking of prolapse of the rectum when there was a corresponding displacement of the mucous membrane of the neighbouring canal.

## VII. NOTE ON THREE LIVING CASES OF ACHONDROPLASIA (CHONDRODYSTROPHIA FŒTALIS, OR SO-CALLED FŒTAL RICKETS).

By JOHN THOMSON, M.D., F.R.C.P.Ed., Extra Physician to the Royal Hospital for Sick Children, Edinburgh.

IN treatises on rickets and elsewhere in medical literature we frequently meet with descriptions and drawings of premature and still-born children with a peculiar deformity, the most striking

feature of which is unnatural shortness of the upper and lower limbs. These used to be regarded as cases of fœtal rickets until examination of their bones proved that they had not the characters of that disease. They were afterwards regarded as fœtal cretins; but now it is recognised that they are examples of an inter-uterine disease entirely distinct from either rickets or cretinism. To this morbid condition a number of names have been applied, the best known, perhaps, being Achondroplasia (Parrot[1]), and Chondrodystrophia Fœtalis (Kaufmann[2]).

We have as yet no idea of the essential cause of this disease. It has, however, been demonstrated that the deformities to which it gives rise are the result of "an absence, arrest, or perversion of the normal process of endochondral ossification of the most definite and universal character in every element of the skeleton in which the process normally takes place during intra-uterine life."[3] This fact explains the nature and distribution of the deformities met with in these cases. For those bones which are formed entirely in membrane, and those which, though formed in cartilage, remain altogether or mainly cartilaginous till a late period of intra-uterine life, are found quite normal in size. Those, on the other hand, which depend on endochondral ossification for their growth *in utero* are all more or less markedly dwarfed. Thus, while the upper part of the cranium, the neck, the trunk (including the clavicles, scapulæ, sternum, and spine), and the carpal and tarsal bones are of the usual size, the base of the skull is too small, causing often a depression at the root of the nose, the ribs and pelvis are deficient, and all the long bones of the limbs are dwarfed to about half their natural length.

In the great majority of cases, the fœtus that is affected by this disease dies *in utero*, or very soon after birth. There are, however, a few cases on record where the child survived for a varying period. For example, Paltauf[4] and Baginsky[5] mention several cases of young infants thus affected; Parrot[6] reports a girl of 7½ years; and Porak[7] gives notes and a drawing of a woman who not only had suffered from the disease herself, but gave birth to an infant who was similarly deformed, and he mentions several other cases of adult dwarfs of this class whose abnormal pelves had brought them under the notice of obstetricians. Boeckh[8] has also recently published a remarkable case of a female dwarf evidently

[1] *La syphilis héréditaire et le rachitis*, Paris, 1886, p. 280.
[2] *Sogenannte Fœtale Rachitis (Chondrodystrophia Fœtalis)*, Berlin, 1892.
[3] Symington and Alexis Thomson, *Lab. Rep. Roy. Coll. Phys.*, vol. iv., 1892, p. 238.
[4] *Ueber den Zwergwuchs*, Vienna, 1891, p. 96.
[5] *Festschrift für Prof. Ed. Henoch*, Berlin, 1890, p. 514.
[6] *Loc. cit.*, p. 282.
[7] *De l'achondroplasie*, Clermont, 1890, p. 25.
[8] *Arch. f. Gynækologie*, Bd. 42, H. 2, 1893, p. 363.

PLATE I.

PLATE II.

John E. Alfred C.

of this kind, whose father and several other relatives had been dwarfs with similar proportions.

Parrot has drawn attention to the very interesting fact that this deformity *seems* to have been well known to the ancient Egyptians, as one of their gods is represented in many of his statues as suffering from it. This was Phtah, whose temple Herodotus mentions as being the most imposing of any that he saw in Memphis. And Charcot and Richer[1] have shown that several of the old masters have put figures of this type into their pictures, and that some of the many dwarfs at the Court of Philip IV., who were painted by Velasquez, evidently owed their position to their having suffered from this intra-uterine malady.

As living examples of this disease are rare, and as, so far as I know, no adult male cases of it have been described and figured before, the following notes of three cases of achondroplasia that I have recently seen may perhaps be of some interest.

CASE I.—John D., aged 5 months, was brought to the New Town Dispensary to be vaccinated on 10th November 1891. Dr Cadell noticed the peculiarity of the child's arms, and kindly sent him to me.

*Family History.*—Father and mother strong, healthy, and well-grown. The patient is their sixth child; the others have all been well-formed.

*Previous Condition.*—The child was born at full time. He has been on the breast since birth, and has seemed quite well; but he used to sweat a great deal on the head. The mother seems not to have noticed before that anything was wrong with the child.

*Present Condition* (Plate I.)[2]—The complexion is pale, but the child is bright and intelligent. The head is large, especially at its upper part; the frontal and parietal eminences are very prominent. The root of the nose is slightly depressed. The anterior fontanelle is very large (fully 2 inches square), and bulges a little. The superficial veins on the scalp are not noticeably distended. There is no craniotabes.

The child measures 23 inches in length. The thorax is narrow, and there is marked rickety beading. The heart, lungs, and abdominal organs are normal.

Both upper and lower limbs are abnormally short, although of the usual thickness. The upper arms measure 3 inches from the acromion to the external condyle. The forearms are correspondingly short. It seems as if the bones of all the limbs were too short for the soft parts, for there are deep annular furrows on the upper arm, on the forearm just above the wrist, on the thigh, and just

[1] Charcot and Richer, *Les difformes et les malades dans l'art*, Paris, 1889, p. 12.

[2] Plate I. is from a drawing by Mr John Williamson, and is an exceedingly accurate reproduction of the photograph of the patient.

above the ankle. The hands are very broad and short, the fingers thick and conical in shape, with the skin crumpled, as if redundant. When the hand is laid flat so that the palm is not hollowed, the fingers spread out in such a way that their ends are separate from one another, and not so close together as in a normal hand. The index and middle fingers curve to the radial, the ring and little fingers to the ulnar side; thus the interval between the points of the middle and ring fingers is much greater than that between those of the other two pairs of digits. I have noticed this peculiarity of the hand in all cases of this disease that I have examined.

The child improved a little in his general health under anti-rachitic treatment.

He died some months after of pneumonia, and I believe that no post-mortem was performed.

CASES II. and III.—A few months ago I had the opportunity of examining, with the help of Dr Alexis Thomson, the two men who are figured in Plate II. The shortness of the time at our disposal must be held as an excuse for the somewhat incomplete character of the following notes.

The elder man (Alfred C.) is 39, the younger (John E.) 36 years old. They are exactly the same height—1·25 mètre (49 inches), and in all essential particulars of their deformity they resemble one another so closely that one seems like the reflection of the other.

Alfred C. was born in Devonshire, and John E. in London. They both belong to families all the members of which are said to be tall, well-grown people. They both say that they have enjoyed very good health, and they are apparently of ordinary average intelligence. Neither of them is married.

Alfred C. is extremely muscular; he has been accustomed to work in the fields, and says that he can do an ordinary man's work. Not long ago he walked 72 miles in 5 days.

John E. has mitral incompetence, which may partly account for the smaller development of his muscles. He has never done heavy work.[1]

The conformation of the two men is so very similar that in most points one description will do for both.

Their heads are somewhat square in shape. The measurements are as follows:—Circumference in Alfred C. = 57 cms.; in John E. = 59 cms.; from meatus to meatus in both men measures 39½ cms. In both there is a marked depression about the root of the nose; the palate is highly arched and narrow, and the lower jaw projects somewhat in advance of the upper. The neck and shoulders are normal, including the clavicles and scapulæ. The trunk seems of

[1] At present an enterprising provision-merchant is availing himself of the attraction which their uncouth appearance has for the public to assist him in drawing attention to the excellence of his wares.

normal length. The thorax is rather narrow (measuring in Alfred C.'s case 83 cms., and in that of John E. 77½ cms. in circumference). There is marked kyphosis, especially in the lower dorsal and upper lumbar regions, and very deep lumbo-sacral lordosis. The movements forward of the spine, as in the act of picking up anything from the ground, are very limited. There is no lateral curvature.

The limbs are normal in thickness, but they are just about half the length they should be. The measurements in Alfred C.'s case are as follows:—

| | | | |
|---|---|---|---|
| Right | humerus | = 16 | cms. |
| „ | radius | = 15½ | „ |
| „ | femur | = 23 | „ |
| „ | fibula | = 23 | „ |
| „ | tibia | = 21 | „ |

Those of the other man are very similar. Both upper and lower limbs present exaggerations of the normal curves; this is most marked in the upper extremities, which cannot be straightened on this account. The ends of the long bones (*e.g.*, condyles of femur) are very large and broad, and terminate abruptly at their junction with the shaft. The hands and feet are very short and broad. The fingers are thick and not quite straight, so that when the hand is stretched straight out with the palm flat their points diverge somewhat from one another—the greatest distance being between the middle and ring fingers.

The gait of both men is extremely waddling, the upper part of the trunk swaying from side to side with each step when they go at all fast.

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*The President* had listened with much interest to Dr Thomson's important communication. The subject he had dealt with was only beginning to be understood. He had recently read a paper by Schwarzwäller on the so-called fœtal rickets, which had led him (the President) to believe that cases he had formerly regarded as rickets required another interpretation, and must be brought into the category described and illustrated by Dr Thomson in his valuable paper.

*Dr J. W. Ballantyne* thought that Dr Thomson was to be congratulated upon the business-like manner in which he had secured photographs of the two adult achondroplasiacs, for he understood that they had only spent a day or two in Edinburgh. Dr Ballantyne was of opinion that the specimen of phocomely shown to the Society some years ago by the President was really one of fœtal achondroplasia; he had recently examined the skeleton, and had come to the conclusion that such was its nature, and he intended before long to read a short paper upon it. Some order was now being

introduced into the confused subject of intra-uterine bone diseases, and it seemed that there were at least three distinct conditions to which the name of fœtal rickets had been applied: there were, first, the cases in which some of the ordinary signs of rickets existed at birth—congenital rickets; there was, second, the condition of so-called fœtal rickets, for which the names achondroplasia, chondrodystrophia fœtalis, etc., had been suggested, and upon which many memoirs had recently appeared, that of Dr Sigfrid Müller being the latest; and there was, third, the morbid state, which had been called cured or finished fœtal rachitis. The specimen which he had shown to the Society some years back did not exactly resemble any of these three types, although it had points in common with one of Kaufmann's thirteen cases. No doubt achondroplasia occurred occasionally in infants and did not prevent their extra-uterine life, for a case or two were on record in which an achondroplasic mother had given birth to a fœtus suffering from the same disease, or rather teratological state. Guéniot had recently shown to the Obstetrical Society of Paris a so-called rachitic woman upon whom he had performed Cæsarean section, and whose fœtus presented the same characters as the mother. This was, in Dr Ballantyne's opinion, a clear case of achondroplasia affecting both mother and fœtus. It would therefore seem that this morbid state is occasionally transmitted, but the number of cases in which the mother is free from any such pathological condition of her skeleton is of course relatively very large. It was, as Kaufmann said, a chondrodystrophia, but what was the cause of the chondrodystrophia could not yet even be hinted at.

*Dr Felkin* thought that the illustrations Dr Thomson showed from Egypt were really intended to represent elephantiasis, the first case of which was depicted 1600 B.C.,—Princess Ati of Punt. The Akkas of Central Africa certainly did not belong to the class of cases dealt with by Dr Thomson. These dwarfs were a distinct race, and they were perfectly formed.

*Dr Church* suggested that the achondroplasic representations of the Egyptian god Ptah referred to in Dr Thomson's interesting paper were not due to the Egyptian idea that that god was deformed, but to the fact that Ptah was the god of development of the human embryo. The perfection of his work was recognised, and the author was represented in his workmanship. Though we could not credit the Egyptians with a knowledge of achondroplasia, it was interesting to notice how often in the course of Dr Ballantyne's papers there was some reference to that ancient people.

*Dr Thomson* replied.

# VIII. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

(SECOND SERIES.)

## III. ALLANTOIDO-ANGIOPAGOUS TWINS—PARACEPHALUS DIPUS ACARDIACUS.

By J. W. BALLANTYNE, M.D., F.R.C.P.E., F.R.S.E., Lecturer on Diseases of Infancy and Childhood, Minto House, and on Midwifery and Diseases of Women, Medical College for Women, Edinburgh.

IN a previous communication the characters of fœtuses belonging to the sub-group paracephalus dipus cardiacus were stated, and I have now to consider those of a very closely allied variety of deformed twin—*paracephalus dipus acardiacus.*

### SUB-GROUP II.—PARACEPHALUS DIPUS ACARDIACUS.

*Historical Notes.*—Acardiac paracephali would seem to be more commonly met with than those provided with a heart, for whilst I was able to gather together only seventeen examples of the latter I have collected forty of the former, including the specimen described at the meeting of this Society in December 1892. It does not, however, necessarily follow that the acardiac occur more frequently than the cardiac, for it may be that several examples of heart-bearing paracephali have, in the absence of details concerning the state of the placenta, been placed amongst other forms of monstrosity, whilst all the acardiac specimens would, from the striking defect in the vascular system, be almost certain to be recorded, and to be grouped with the allied types of acephalic and amorphous fœtuses.

The first specimen of this variety of paracephalic monsters seems to have been that described by Goeller in 1683. Saviard recorded another in the first half of the eighteenth century, and Curtius, Marrigues, Lecat, Büttner, Odhelius, and Kähler described cases in the second half of the same century. Sixteen specimens were put on record between 1800 and 1850 by the following writers:—Borgnoni (1806), Brodie (1809), Clesius (1812), Boutin (1817), Rossi (1820), Laroche (1823), Peschier (1826), Rodati (1827 ?), Svitzer (1829), Tonnelè (1829), Seiler (1833), Embleton (1841), Jackson (1847), Hempel (1850), and Calori (1850). In 1855 Luton fully described a fœtus which very closely resembled that shown to this Society in December 1892, and since 1855 specimens have been observed by Desormeaux and Gervais (1860), Poppel (1862), Genth (1868), Calori (1869), Moldenhauer (1873), Lusk (1875–6), Nitot (1876), Meïmaroglu (1879), Breus (1882), Taruffi (1882), Koch, Donat, Calori (1885), and Doran (1889).

*Synonyms.*—The earlier writers, as a rule, contented themselves

with describing their specimens as "monstrous fœtuses" or "abortions," whilst more recent observers adopted the terms "acephalic" or "acardiac fœtus." Goeller, for instance, entitled his communication "Abortus humani monstrosi hist. anatom;" Rossi used the phrase "Descrizione d'un feto mostruoso," Hempel that of "De Monstris Acephalis," and Poppel that of "Ueber herzlose missgeburten." Calori recognised that the term acephalic could not be correctly given to these acardiacs, and proposed to call them "cefaloacardi." Taruffi in 1882 introduced the designation "paracephalus dipus acardiacus," and in this way grouped all these specimens together in a separate and clearly defined class.

## Clinical Details.

In a few of the recorded cases (Nos. 31, 35, and 39) no clinical details are given, and in some others (2, 11, 12, 15, and 17) I am unable to give any facts with regard to the history of the confinements, having found it impossible to consult the original reports. In all the other cases, however, the clinical history was more or less fully given. No doubt the monstrous fœtus was always the product of a plural pregnancy; but in certain cases (11, 19, and 20) the clinical details alone were not sufficient to determine this. Of the remaining thirty-seven cases, in three the pregnancy resulted in the birth of triplets, one of which was monstrous (Nos. 1, 8, and 16), and in thirty-four it ended in the birth of twins, one normal in form, the other monstrous.

*Maternal History.*—Details concerning the general health of the mother were seldom given; but in three instances (27, 30, and 38) it was stated that she was a healthy woman, whilst in one (40) she was delicate and had suffered much from chronic bronchitis. The mother's age was 20 in Nos. 13 and 21; 24 in No. 22; 26 in No. 32; 27 in Nos. 3 and 27; 29 in No. 8; 30 in No. 30; 34 in Nos. 5 and 36; and 35 in No. 40. She was a i.-para in Nos. 13, 22, 23, and 32; a ii.-para in No. 21; a iii.-para in Nos. 27 and 38; a v.-para in No. 8; a vii.-para in Nos. 5 and 40; and a "multipara" in Nos. 30 and 36. With regard to previous obstetric experiences details were seldom forthcoming, but in no case did I find in the record earlier plural pregnancies, and in Nos. 8, 27, 36, 38, and 40 it was distinctly stated that the gestations had all ended in the birth of single infants, and that the labours had been normal.

The pregnancy which resulted in the birth of an acardiac paracephalic fœtus was, as has been said, always plural, and it would appear that it usually terminated prematurely. Labour came on before the sixth month in Nos. 14 and 33; at the sixth month in Nos. 20 and 22; between the sixth and seventh months in Nos. 19 and 26; at the seventh month in Nos. 1, 8, 10, and 24; between the seventh and eighth months in No. 21; at the eighth month in Nos. 3, 9, 13, 27, and 29; between the eighth and ninth months in Nos.

32 and 36; at or about the ninth month in Nos. 5, 18, 38, and 40; and at the full term in No. 4.

In three cases (1, 3, and 13) the mother attributed the monstrosity to an impression received during pregnancy. There was hydramnios in Nos. 5, 27, and 30, and in No. 27 it was noted that the liquor amnii was bad-smelling. Abdominal pain during pregnancy was noted in Nos. 8, 27, and 40; the mother was dropsical in No. 30, and suffered much from bronchitis in No. 40. The normal twin was almost invariably the first to be born (Nos. 3, 4, 5, 6, 21, 22, 25, 27, 29, 30, 32, 34, 36, 37, 38, 40); but in two cases (Nos. 9 and 26) it was definitely stated that the monster was the first to appear. In the triplet cases the deformed infant was the second born in No. 1, and the third to be expelled in No. 8. In some of the cases the order of birth was not stated, and in others I have not been able to consult the originals. The time that elapsed between the birth of the normal infant and that of the monster was forty-five minutes in No. 27, about one hour in No. 40, two hours in Nos. 25 and 36, five hours in No. 34, and seven hours in No. 32. Further details of the confinement were seldom given: in Nos. 21 and 27 the deformed twin came as a footling; it was a breech in No. 22; in Nos. 5, 20, 30, and 32 the labour was delayed, and in the last-named the mother had an eclamptic fit immediately after the birth of the monster. In No. 40 there was alarming hæmorrhage before and after the delivery of the paracephalic twin. Post-partum bleeding from retained pieces of membranes and placenta was noted in No. 36. In some instances the monstrous fœtus had to be removed by the hands or by forceps; thus in No. 37, whilst the fœtus was being extracted the legs separated from the trunk, and the latter had to be delivered by means of the forceps. The placenta was expelled along with the deformed infant in Nos. 27 and 36; but it had to be artifically removed for grave symptoms in Nos. 32 and 40. In No. 8 the mother was very weak and ill after delivery, but ultimately recovered; and in No. 9 a uterine mole was expelled five days after the labour. It is probable that in the other cases the puerperium was normal. In one case (No. 8) there is an interesting note with regard to the later obstetric history: it is to the effect that on two subsequent occasions the mother gave birth to twins, and in both instances one of these twins was slightly deformed (contorted feet and curved tibiæ).

*Paternal and Family History.*—In only one case (No. 40) was the health of the father noted, and in that it was good. In the same instance there was no family history of plural or otherwise abnormal labours; but in No. 16 the grandmother and aunt had both given birth to twins.

*Infantile History.*—The deformed twin was necessarily always dead-born, but in only one instance (No. 28) was it in a state of advanced maceration. The other twin was in every case well formed; but it was dead-born in Nos. 8, 9, 10, 13, 24, 27, and 28,

and it died during labour in No. 5. It was, however, born alive in Nos. 3, 6, 7, 30, 32, 38, and 40; but in No. 3 it only lived a short time, and in No. 40 it was weakly and died at the fourth month.

It was not quite normal in No. 33, having the foot twisted at right angles to the tibia; in this instance also a complete account of the dissection of the infant is given. The twins (or triplets) were probably in every case of the same sex, but information on this point was wanting in Nos. 15 and 39, and was not very definite in Nos. 6, 16, 19, 20, 26, and 31. Both were males in seventeen cases (3, 4, 7, 8, 10, 12, 13, 17, 21, 22, 23, 24, 27, 30, 32, 36, and 40), and females in fourteen instances (1, 2, 5, 9, 11, 14, 18, 25, 28, 29, 33, 34, 35, and 38).

## Morbid Anatomy.

### I. Of the Fœtus.

*a. General External Appearances and Measurements.*—Fœtuses belonging to the sub-group paracephalus dipus acardiacus had invariably an appearance that was only remotely human. The deformity was nearly always greatly increased by the marked subcutaneous œdema which existed. The writers who have described specimens have used various expressions in order to convey to the reader's mind some idea of the form of the infant. Nearly all have noted that the upper part was more monstrous in appearance than the lower, and have described it as conoid (14), pyramidal with base above (17), polylobate (5), etc. The head and thorax were generally fused together without the indication of a neck, and the appearance thus produced was compared to a monk's hood or cape or cylindrical mass (Nos. 4, 10, 20, 29, 30, 33, etc.) In some cases the body was divided into two parts (an upper, made up of head and thorax, and a lower, consisting of pelvis and lower limbs) by a deep constriction, as in my specimen (40), and in Nos. 25 and 28; in other instances the fœtus had the shape of a large skate or ray (32), or constituted a reniform mass (26).

In size these fœtuses were generally less bulky than their co-twins, and they were also smaller than was normal for the age of intra-uterine life arrived at. In one case (14) the deformed fœtus measured 3 inches 9 lines (9·5 cms.) in length, whilst the normal twin was 6 inches; in another instance (13) it was stated that the monster had the usual length; and in No. 33 the normal twin measured 21 cms. in length and the monster 17 cms. In other cases the total length measured something between the two first-named extremes: it was 38 cms. in Nos. 6 and 32; 35·5 cms. in No. 7; 33 cms. in Nos. 10 and 38; 32 cms. in Nos. 5 and 36; 28 cms. in No. 40; 27 cms. in No. 21; 25 cms. in No. 28; and 18 cms. in No. 27. The weight was not often stated: it was 103 grms. in No. 27, 1000 grms. in No. 36, 1615 grms. in No. 38, and nearly

4 lbs. in No. 21. In one case (8) the monster was larger and heavier than either of the two fœtuses born with it.

*b. State of the Subcutaneous Tissue.*—It is probable that in every case the subcutaneous tissue all over the body was œdematous; this fact was specially dwelt upon in Nos. 1, 3, 7, 8, 13, 21, 24, 25, 26, 27, 30, 31, 32, 34, 36, 37, 38, 39, and 40. In other instances the observers were struck by the presence of serous cysts of varying size in the subcutaneous cellular tissue. Very common situations for these were the back and sides of the head and neck (Nos. 1, 4, 5, 6, 8, 9, 10, 18, 19, 20, 26, 29, 32, 38, and 40), and the posterior and lateral thoracic walls (Nos. 13, 21, and 24). In other cases (Nos. 3, 29, 34, 37, etc.) the cysts were universally distributed throughout the subcutaneous tissue. The adipose tissue was described as scanty in one or two instances (*e.g.*, No. 38), whilst in Nos. 33 and 36 it was said to be large in amount. The subcutaneous cysts varied in size from that of a pea or hazel-nut to that of a cocoa-nut; they had a smooth lining membrane, and they were filled with a clear pale yellow sero-albuminous fluid. The largest cysts usually lay at the back of the neck.

*c. State of the Head.*—The presence of serous cysts in the subcutaneous tissue of the head and neck has been already mentioned, and no doubt some observers were led by this to conclude that hydrocephalus existed in these cases. True hydrocephalus was, however, sometimes present (Nos. 1, 4, 9, 12, 14, 15, 18, 20, 25, 28, 32, and 40). More commonly the cranium was very small but osseous, and covered with a thick layer of greatly œdematous tissue, so that whilst the head was as large or larger than normal the cranium was no bigger than that of a hen (No. 18), and sometimes had its size compared to that of a nut (22, 26, 30). The cranium was also very small in Nos. 3, 21, 23, 27, 31, and 35; it was hemicephalic in Nos. 28 and 36; hemicephalic and cyclopic in No. 38; greatly deformed in No. 7; and several of the vault-bones were absent in Nos. 5 and 6. The presence of hairs on the scalp was sometimes noted (*e.g.*, in Nos. 16, 25, 26, 27, 30, 32, 36, 38, and 40); their absence was specially mentioned in Nos. 13 and 24.

The condition of the cranial contents varied considerably. The best developed brain was found in No. 24; but even in it the corpus callosum, fornix, septum lucidum, and mammillary tubercles were absent. Usually the cerebrum was very defective (Nos. 1, 3, 8, 9, 12, and 29); it was macerated in Nos. 10, 14, 17, 27, 32, 33, and 34; it was absent in Nos. 7 and 36; and it constituted a small whitish mass in No. 30. The cerebellum was normal in No. 4; it was present in Nos. 5, 37, and 38; present but diffluent in Nos. 32 and 40; very small in Nos. 24 and 29; and it was absent in Nos. 7, 9, and 28. The medulla oblongata was normal in No. 4, was very small in No. 24, and was absent in Nos. 7, 9, and 40. The cranial nerves were not often described; they were said to be normal in No. 10, but in No. 4 the absence of the optic and

olfactory was noted. In No. 36 there were two optic nerves but no commissure, and the other cranial nerves were not seen; whilst in No. 38, the fifth pair, traces of the vagi and the oculo-motor nerves were the only ones present.

The bones of the basis cranii were usually present, but in Nos. 34 and 38 the sphenoid and ethmoid were defective; there was no vomer or palate in Nos. 34, 40, and others; and there was cleft palate in Nos. 10, 13, 25, etc. There was no foramen magnum in No. 40. The facial bones were said to be absent in Nos. 17 and 22, and to be not recognisable in No. 23; several of them were absent in Nos. 5 and 14; three only were present in No. 38 (malars and united maxillæ); no nasals were found in Nos. 4 and 13; and the lower maxilla was cleft in Nos. 13 and 23. Both the bones of the face and those of the basis cranii were fairly normal in No. 36. The eyes, ears, nose, and mouth were almost always very imperfect. The eyes were, however, well developed in No. 36. The absence of eyeballs and eyelids was noted in Nos. 9 and 26; there were traces of eyelids, but not of eyeballs, in Nos. 13, 20, 35, and 40; the eyes were indicated by tracts of coloured skin in No. 11, by palpebral fissures in Nos. 17 and 19, and by closed eyelids in Nos. 12, 29, and 35; and the organs of vision were very rudimentary in Nos. 1, 13, 25, 30, 32, and 34. There was a single eye in No. 38. Traces of the nose were present in Nos. 1, 9, 10, 12, 17, 19, 20, 21, 33, 35, and 40; it was absent in Nos. 26 and 38; and the nasal was continuous with the buccal cavity in Nos. 23, 25, 32, 34, and 40. The ears, like the nose, were very imperfectly formed; they were both absent in Nos. 17 and 26, and one only was present in Nos. 9 and 19; they were deformed in Nos. 1, 4, 11, 13, 16, 20, 29, 30, 32, 34, and 38; and the external auditory meatus was noted to be imperforate in Nos. 4, 25, and 40. In No. 36, however, external ears with shallow meatuses were present. There was no mouth in No. 15; it was badly formed in Nos. 9, 19, and 20; and there was hare-lip in Nos. 10, 13, 24, 25, and 34. There was double hare-lip and cleft palate in No. 36. There was no tongue in No. 23; it was adherent to the lower jaw in No. 9, and rudimentary in No. 37; and in No. 25 it seemed to spring from the hyoid bone rather than from the arch of the buccal cavity. In No. 3 the only trace of a face was a scrotum-like appendage.

*d. State of the Vertebral Column.*—In many of the recorded cases the state of the vertebral column was very imperfectly given. There was no trace whatever of a spine in only two specimens—viz., in Luton's and my own (25 and 40). On the other hand, all the vertebræ were present in Nos. 3, 5, 20, 22, 27, 30, and 36. There were some additional cervical vertebræ in No. 32. There were only twenty vertebræ in No. 6, and nineteen besides the sacral in No. 21. Many were absent in No. 26, and the sacrum and coccyx were represented by irregular osseous nuclei. In No. 17 there were eight cervical, nine dorsal, and four lumbar vertebræ;

in No. 31 there were three cervical, twelve dorsal, and five lumbar, whilst the sacrum was well formed; and in No. 38 there were seven cervical, ten dorsal, four lumbar, and five sacral. It was stated that the pelvis was normally developed in Nos. 6, 30, and 32; but in Nos. 25 and 40, through the absence of the sacrum, the iliac bones came into contact posteriorly. There was spina bifida in Nos. 6 and 28. The spinal cord was present, and probably normal, in Nos. 10, 12, 18, 20, 21, 22, 24, 27, 29, 30, and 36; but it was absent in Nos. 7, 25, 28, 35, and 40. There was a trace of the cord in No. 2; it was fluid in No. 32; and it was present, but much narrower in the cervical region than normal, in No. 23. The spine showed a scoliotic curve in Nos. 16 and 28, and there was both scoliosis and lordosis in No. 27.

*e. State of the Upper Limbs.*—The upper extremities were frequently entirely wanting (Nos. 2, 7, 12, 15, 16, 19, 23, 24, and 28), and in some other instances they were represented only by scapula and clavicle (Nos. 4, 26, 27, and 38). In a few cases the right upper limb was absent, or nearly so, and the left present (Nos. 30, 32, 35, and 37). In nearly all the other specimens the upper limbs, although present, were more or less defective (Nos. 1, 3, 5, 8, 9, 10, 11, 13, 14, 18, 20, 21, 22, 25, 29, 31, 33, 36, and 40), and the degree of imperfection varied from the absence of one or more fingers to that of the humerus, or radius, or ulna and radius. In many cases the arms were enclosed within the caphalo-thoracic mass, and in some instances (*e.g.*, Nos. 20, 36, and 40) the hands were clubbed. The specimens in which the upper extremities were most nearly normal were Nos. 1, 8, 10, and 29.

*f. State of the Thorax and its Viscera.*—In no specimen was there a heart; indeed, the absence of the heart is the distinctive character of this sub-group; but in No. 3 there was a possible trace of this organ, in Nos. 9 and 28 there was a structure regarded as the pericardium, and in No. 13 there existed a glutinous mass which the author thought might be a heart. The diaphragm was normal in Nos. 36 and 37; it was absent in Nos. 3, 5, 13, 14, 19, 22, 27, 32, 33, 35, 39, and 40; it was present, but membranous, in Nos. 4, 7, 10, 20, 29, 34, and 38; and it was also found, but in a more or less imperfect state, in Nos. 1, 6, 9, 13, 16, 20, 28, 30, and 31. The thymus gland was said to be absent in Nos. 3, 4, 6, 7, 10, 11, 12, 17, 24, 26, 29, 32, 35, 36, and 38; it was possibly present in Nos. 25, 28, 37, and 39. The thyroid gland was seldom noted; it was absent in Nos. 29 and 38. There were no lungs in the great majority of the specimens (Nos. 1, 2, 4, 5, 6, 7, 9, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 26, 27, 34, 35, and 40); but some traces of these organs were found occasionally (8, 10, 24, 25, 28, 30, 32, 33, 36, and 37), and the right was rudimentary and the left absent in one instance (29). In No. 38 there was one large pulmonary sac which filled the whole thoracic cavity, and sent a projection through the diaphragm into the abdomen. As was to be expected,

the larynx and trachea were often absent, and when present were generally defective. The former was absent in Nos. 3, 20, 25, 26, and 28; present in Nos. 29 and 30; present, but defective, in Nos. 23, 32, 37, and 40; whilst the latter was absent in Nos. 6, 7, 8, 11, 12, 26, 28, 35, and 36; was present in Nos. 10, 29, 37, and 38; and was present, but rudimentary, in Nos. 1, 23, 25, 30, 32, and 40. The œsophagus was absent in the great majority of cases (1, 3, 4, 6, 7, 8, 11, 12, 24, 28, 29, 32, 35, and 40); it ended blindly in Nos. 10, 30, and 37; and in only two instances (25 and 36) did it communicate with the stomach. The presence of sympathetic ganglia was noted in Nos. 21, 24, and 38; the vagi were found in Nos. 24, 25, and 29; and in only one case was there a note concerning the thoracic duct,—it was absent in No. 17. It was sometimes mentioned that the thoracic cavity was filled with cystic or œdematous connective tissue (Nos. 4, 5, 7, 10, 21, 24, 27, 34, and 36). The osseous framework of the chest was often imperfect, the ribs, when present, seldom uniting in a normal way with the sternum. The ribs seem to have been present in their usual number in Nos. 3, 4, 7, 28, 32, and 36; some of them were wanting in Nos. 5, 6, 19, 21, 26, 27, and 38; and in one instance (25) they were all absent. The sternum was wanting in Nos. 27, 28, 30, and 36; it was present in Nos. 7, 20, and 32; and it was rudimentary in Nos. 4 and 21. It consisted of two halves, and was quite cartilaginous, in No. 38. The state of the great thoracic vessels will be considered elsewhere.

*g. State of the Abdomen and its Viscera.*—The abdominal organs were markedly defective in this sub-group of paracephalic fœtuses. In the cases in which the diaphragm was absent the abdomen and thorax formed one cavity (Nos. 3, 5, 13, 14, 19, 22, 27, 32, 35, 38, 39, and 40). There was no trace of the liver in the vast majority of instances (Nos. 1, 2, 3, 4, 5, 6, 8, 10, 14, 16, 18, 19, 21, 22, 24, 25 (?), 26, 27, 28, 29, 30, 31, 32, 34, 37, and 38); it was present, but small, and without a gall-bladder, in No. 9; it was also found in Nos. 33 and 36,—in the latter case the gall-badder was present, but not the duct; and in Nos. 13, 20, 35, and 40 there were found glandular rudiments, which were probably hepatic in nature. The spleen was absent in Nos. 1, 2, 4, 5, 6, 8, 14, 20, 21, 22, 24, 27, 28, 29, 30, 31, 32 (?), 35, 37, and 38; it was present in Nos. 9. 10, 33, and 36, and perhaps so in Nos. 13 and 40; and there were two spleens in No. 34. The pancreas was stated to be absent in Nos. 3, 5, 6, 8, 13, 21, 22, 24, 27, 28, 29, 30, 31, 38, and 40, and its presence was doubtful in Nos. 20, 25, 36, and 37. The stomach was not so frequently wanting as were the organs above mentioned: it was present in Nos. 3, 9, 10, 13, 19, 20, 25, 30 (?), 32 (?), 33, and 34; but it was not found in Nos. 1, 2, 4, 5, 6, 8, 18, 21, 22, 24, 27, 29, 31, 38, and 40. The intestine was present, and probably complete, in only one instance (No. 9); in every other case it was markedly defective, and it was often also herniated. Almost every

degree of deformity was met with, from that in which the whole bowel was present, but was imperforate (No. 34), to that in which there only existed a small loop of gut, blind at both ends. The cases in which the intestine was described as defective were 1, 2, 3, 4, 5, 6, 8, 10, 12, 13, 14, 16, 19, 21, 22, 24, 26, 28, 29, 30, 31, 32, 33, 35, 38, 39, and 40; the fact that some of the coils lay outside the abdominal cavity was mentioned in Nos. 4, 7, 13, 17, 21, 25, 27, and 40. It was noted in No. 29 that lymphatics were not found in the mesentery. The characters of the contents of the intestine were not often touched upon, but in No. 5 it was noted that the bowel contained an ash-coloured material, and not the normal green meconium.

The urinary organs were not so generally defective in this group of monsters as were the digestive. Both kidneys were present in Nos. 1, 3, 9, 10, 17 (in abnormal situation), 20, 22, 27, 28 (?), 29, 32, 33, 36, 37, 38, and 39; there was a single kidney in Nos. 2, 19, 21, 26 (?), 30, 34, and 40 (?); and both organs were absent in Nos. 4, 5, 6, 8, 24, 25, 31, and 35. In No. 5, however, there was a single organ, which the author (Lecat) called a kidney-liver. The absence of the ureters was specially noted in Nos. 4, 6, 24, and 28; and their presence in Nos. 23, 27, 30, 32, 34, 37, and 38. The urinary bladder was generally present (Nos. 5, 10, 12, 13, 20, 21, 22, 23, 24, 27, 29, 31, 34, 35, 36, 37, 38, and 40), although it was very small in size in Nos. 27 and 34; but its absence was observed in a few cases (4, 9, 17, 28, and 30). The suprarenal glands were not always mentioned, but in three cases their absence was noted (Nos. 4, 25, and 36), and in eleven their presence (Nos. 1, 3, 10, 12, 13 (?), 21, 23, 24, 27, 29 (small), and 32). The right alone was found in No. 38. No sympathetic ganglia were seen in No. 35. The presence within the abdomen of cysts, of dropsical fluid, and of gelatinous tissue was mentioned in Nos. 1, 7, aud 13; there were signs of peritonitis in No. 28. With regard to the internal genital organs details were forthcoming in six out of the twelve cases in which the sex of the fœtus was female. The uterus was present in No. 5; the uterus, tubes, and ovaries were found in No. 38, but the ovaries were wanting in No. 20; and the uterus, ovaries, and tubes were present, but the vagina absent, in No. 34. The uterus and its annexa were not found in Nos. 25 and 28. Goeller noted that in his specimen (No. 1) the uterus was bicornuous. In the case of the fœtuses that were presumably of the male sex the testicles were absent in Nos. 6, 31, and 36; these glands were found, but were intra-abdominal in position or fused with surrounding parts, in Nos. 10, 12, 17 (one testicle only), 21, 22, 23, 24, and 32. The presence of the prostate gland was noted in No. 21, and its absence in No. 36.

*h. State of External Genitals and Anus.*—The external genitals were recognisable as those of a male in Nos. 6, 7, 8, 10, 24, 27, 30, 32, 36, and 40; in most of these instances the testicles were absent

from the scrotum, and in Nos. 27 and 36 it was stated that the penis was imperforate. Female external genitals were apparent in Nos. 14, 19, 20, 28, 29, and 38. In cases 4 and 16 there were no traces of external genital organs at all. The anus was described as imperforate in Nos. 1, 5, 6, 13, 19, 25, 26, 27, 32, and 36; the rectum opened into the urethra by a small aperture in No. 21, and into the vagina in No. 38; and there was anal patency in four instances (Nos. 4, 20, 37, and 40). Details were not forthcoming in the other cases.

*i. State of the Lower Limbs.*—The lower limbs were in a few instances nearly quite normal (Nos. 12, 18, 22, 23, 25, 31, 33, and 37); but in a large number of cases they were deformed. In Nos. 1, 2, 3, 7, 8, 10, 14, 19, 20, 21, 28, 29, 34, 38, 39, and 40, some of the digits were wanting. In No. 1 both fibulæ were also absent; in Nos. 4, 5, 6, 7, 8, 9, 11, 16, 19, 21, 26, 27, 28, 29, 33, 36, 38, 39, and 40 there were other deformities, usually of the nature of contortions and clubbing. In Nos. 6 and 26 the right lower limb consisted of little more than the foot, whilst the left was less deformed. In three instances only (17, 30, and 32) the lower extremities were more or less fused together. It might, perhaps, be well to group these together as a sireniform variety of paracephalus acardiacus (p. sympus), were it not that such subdivisions are confusing. In No 17 there were two femora with distinct acetabula, but the limbs were united at the knees, and these, together with the feet, had the same skin covering. In No. 30 the fœtus terminated inferiorly in a pointed tail-like structure, which ended in two feet; this structure was sharply flexed upon the abdomen, and could not be extended save by the use of violence. In No. 32, also, the lower limbs were fused together into a kind of tail, but the feet were free: the legs were joined to one another by their external borders, the tibiæ being rotated so that their posterior surface faced to the front and the fibulæ lying internal to them, so that the great toes were on the outside and the single os calcis lay anteriorly. With the exception of these three cases, the lower limbs were separate in all.

*j. State of Muscular System.*—Little notice was taken of the muscular system, but its development was occasionally referred to as good (Nos. 26, 30, 31, 32, and 38); in other cases it was stated to be defective, as in Nos. 21, 24, and 36.

II. Of the Placenta and Cord.

It is probable that in all the cases recorded there existed either a single placenta or two placentas in vascular connexion with each other; but I have been unable to find any details concerning the fœtal annexa in a considerable number of instances (Nos. 1, 3, 5, 7, 8, 16, 19, 20, 21, 28, 31, 35, 37, and 39). The placenta supplying the twins was definitely stated to be single in Nos. 4, 6, 10, 11, 14, 24, 25, 26, 27, 29, 30, 32, 33, 34, 36, and 38. Only in one

instance (40) was the accoucheur of opinion that there were two separate placentæ, but the clinical details of that case seem to show that there was at least a very close vascular connexion between the two, if not a true organic union. In only one or two cases are further details of the characters of the placenta given: it was not infrequently said to be large; it was once described as normal in appearance (33), as tongue-shaped (30), and in No. 11 it was said to contain no red blood, but only lymphatic vessels. It is probable that whilst the placenta and chorion was single, the amnion was usually double. This was the arrangement found in Nos. 14, 25, 26, 32, 33, 34, and 36; but in No. 29 it was noted that the amniotic sac was single. The sac of the normal fœtus was the larger in No. 33. Details are wanting in other instances.

When the umbilical cord of the normal twin was mentioned it was said to be normal, save in No. 33, in which it was very narrow, much twisted, and inserted on the membranes. The cord of the monster, on the other hand, was usually defective. It was described as small, short, and thin in Nos. 4, 14, 21, 25, 26, 27, 28, 30, 32, 33, 34, and 40; it had a marginate insertion in Nos. 25, 29, and 32; it passed to the placenta in the membranes in Nos. 26, 33, and 40; and it contained two arteries and one vein in Nos. 3 and 21, one artery and one vein in Nos. 10, 20, 26, 29, 32, 33, 36, and 40; two veins and two arteries in Nos. 24 and 27; and one vein and no artery in No. 30. Sometimes it was noted that the vessels of the two cords anastomosed (*e.g.*, Nos. 33 and 36), and no doubt this was always the case.

The vessels of the cord entered the body of the fœtus, and since there was no heart for them to pass to, they became directly continuous with the fœtal bloodvessels; but the vascular arrangements thus produced varied within wide limits in different cases. Within the deformed fœtus there were usually two large vessels, one corresponding to the vena cava inferior and receiving the blood from the umbilical vein, and the other representing the aorta and becoming continuous with the umbilical artery or arteries. These two vessels received and gave off in a more or less irregular manner branches which could, however, usually be identified as subclavian, carotid, jugular, mesenteric, iliac, renal, etc.

The most complete descriptions of the vascular arrangements were those found in connexion with cases 10, 20, 21, 24, 25, 27, 29, 30, 32, 34, 35, 36, 37, and 38. In No. 20, in which the cord contained one artery and one vein, the following vessels were found: There was an aorta which gave off several branches in its course; above, it bifurcated into two carotids after giving off two subclavians; and below, it divided on the left side into four branches, and on the right it had one branch, the right common iliac; and there was also a vena cava which was formed superiorly by two trunks from the head and by the subclavian veins, whilst inferiorly it was continued downwards as the iliac veins; it received various

veins, amongst which were the umbilical and the portal, and had no connexion with the liver. Another type of arrangement was found in Nos. 24 and 27, in which there were two umbilical arteries and two veins. In No. 27 one umbilical vein entered the body, proceeded downwards, divided into the two iliac veins, and received the left renal vein. The other umbilical vein passed upwards in the body, and was joined by the right renal vein, by the hepatic, mesenteric, intercostal, and jugular veins. The umbilical artery divided into trunks immediately within the body. One of these, the smaller, passed downwards as the iliac artery of the left side; the other, a much larger vessel, passed to join the aorta which received the mesenteric and other branches, and ended above in the carotids and subclavians, and below in the hypogastric and external iliac of the right side. The vessels in the other recorded cases had an arrangement differing only in a few details from those found in the above instances.

## General Characters.

As will have been learned from the foregoing analysis, acardiac paracephalic fœtuses resemble those provided with hearts in a very striking way, so that many of the general characters of the latter are equally those of the former. So close are the resemblances which exist between these two kinds of monsters, both in their clinical history and pathological anatomy, that their classification as sub-groups of the variety paracephalus dipus is fully warranted. This is true, notwithstanding the fact that in one sub-group the heart is absent, whilst in the other it is present, albeit usually malformed. It is therefore evident that the absence of this organ cannot be regarded as an all-important character for purposes of classification. In fact, the resemblance between cardiac and acardiac paracephali is so great that it is impossible before dissection to predict whether a heart will be found or not in any given case.

Another interesting fact is found in the want of correlation in the malformations: thus the heart may be entirely absent, and the brain not only present, but very nearly perfect in form and parts (No. 24); and again, the skeleton may be not far removed from the normal, whilst nearly all the viscera are entirely wanting.

I shall here mention only those characters in which acardiac paracephali seem to differ from those provided with hearts. Possibly the difference noted in the first characteristic is only accidental.

1. The mother is not infrequently a primipara, and does not by any means always possess a previous bad obstetric history.

2. Whilst in some cases the head is hydrocephalic, as is usually the case in cardiac paracephali, it is also not uncommonly in a state of osseous synostosis.

3. The heart is always absent.

4. It would seem that in this variety of monster there is one circulation, and that an imperfect one. The blood is probably forced on by the heart of the normal twin.

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# IX. REPORT ON TWO FURTHER CASES OF GENERAL DROPSY OF THE FŒTUS.

By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S.E.

By a somewhat curious coincidence the two specimens of general fœtal dropsy now to be described came into my possession on the same day. They form the fourth and fifth examples of this disease that I have been able to investigate; the results of the examination of the three previous cases are to be found in the first volume of my work *The Diseases of the Fœtus.*

Specimen I.

A. *Clinical History.*—On January 11th, 1893, I received from my friend Dr J. D. Williams of Dowlais a fœtus which showed in a characteristic way the condition known as general dropsy or anasarca, and he also kindly furnished me with the following clinical details.

The mother was 28 years old, was 5 feet in height, thin, and of a nervous constitution. She was an only child, and had always enjoyed good health save when carrying the infant to be described in this paper. She first menstruated when 14 years old. The menstrual flow was normal in type, but was always accompanied at its onset by severe pain. She was married at the age of 18, and had been seven times pregnant. Her first gestation ended at the eighth month in the birth of a boy, who died a few hours after he was born; her second went to the full term, when a girl, who is now alive, was born; her third also went to the full term, was complicated by hydramnios, and resulted in the birth of a boy, who, like her first-born, died in a few hours; her fourth terminated in abortion at the tenth week; and her fifth and sixth both went to the full term, and resulted, the former in the birth of a girl, the latter in that of a boy; both these children are now living. With regard to her seventh pregnancy, she last menstruated in June 1892 during lactation, and felt life in the last week of October.

In November she suffered greatly from facial neuralgia due to a decayed tooth; this ceased after the extraction of the tooth under nitrous oxide gas. During December she was attacked with acute pharyngitis: the inflammatory mischief spread to the œsophagus and stomach, and she suffered from œsophagitis and gastritis up to the time of her confinement in January 1983. Her feet and ankles were swollen with œdema during the last two months of pregnancy, and frequent attacks of palpitation occurred. At night she was much troubled with dyspnœa and a choking sensation, and had to sit up in bed or walk about the room in order to obtain relief. Towards the end of her pregnancy she could scarcely move about on account of the weight and feeling of fulness in the abdomen,

which she stated bulged more in front and less at the sides and back than in previous gestations. During the three weeks immediately preceding the confinement she felt no fœtal movements, and during the last fortnight of pregnancy her urine contained a small quantity of albumen, but no sugar.

At 9 A.M. on January the 8th, 1893, the patient began to suffer from pains in the front and sides of the abdomen and in the back; these did not feel like the pains of her previous labours, but there was a sufficient resemblance to make her believe that she was about to be confined. Towards evening they became worse, a midwife was sent for, and Dr Williams visited the patient at 10 P.M. The temperature was 99° F., the respiration rate was 30, and the pulse 100. The abdomen was so sensitive that palpation could not be borne, and it was, according to her statement, larger than at previous confinements. The circumference at the level of the umbilicus was 41 inches. The fœtal heart-sounds could not be heard, although carefully listened for. The os uteri admitted easily the tip of one finger. Dr Williams introduced a Barnes' bag, and on his return at midnight found that dilatation was completed. He ruptured the membranes and 3½ quarts of liquor amnii escaped. At 12·45 the head was born, but the trunk was still in the passages, although the pains were severe and almost continuous, and the expulsive efforts violent. Tapes were then applied to the arms at the axillæ, and by means of traction the infant was born at 1 A.M. (January 9th). The placenta had to be expelled by the Credé method; its margin was the first part to appear at the vulva. The child was still-born, and had the appearances to be afterwards described. One drachm of ergot (liquid extract) was given. The further progress of the case was as follows:—

*January 9th*, 11 A.M.—Temperature, 99°; pulse, 82; respiration normal. Tenderness of abdomen. Pain and tenderness in right groin and thigh. Vaginal discharge scanty. Sugar (puerperal glycosuria) and albumen in urine.

*January 10th.*—Temperature, pulse, and respiration same as on January 9th. Pain in right thigh and groin. Had slept for six hours, being first sleep since confinement. Back of tongue, fauces, tonsils, and back of pharynx were congested, and bled when touched with brush used to apply glycerine and tannic acid. Had parched and dry feeling in throat, and pain in the bowels from flatulence. Vaginal discharge offensive. Vaginal douche (perchloride of mercury, 1 in 4000) and a carbolic acid pill (1 gr.) were given night and morning. Sugar and albumen in urine.

*January 11th.*—Same symptoms and treatment. Temperature 99°·8; pulse 98; respiration normal. Castor oil given.

*January 12th.*—Bowels moved once. Abdominal pain gone. Condition of throat better. Sugar and albumen in urine. Lochia still offensive. Temperature 99°; pulse 96. Carbolic acid pill was stopped.

*January 13th.*—Improvement in all the symptoms. Urine contained albumen and a slight trace of sugar.

*January 14th.*—Temperature 99°; pulse 84. Right thigh and groin still tender, but not painful. Vaginal discharge increased in amount, and not so offensive. Glycerine and tannic acid application to throat was stopped. Urine not examined.

*January 15th.*—Temperature and pulse normal. Lochial discharge sweet. Urine contained a trace of albumen, but no sugar. Patient feels well and eats heartily. Vaginal douches stopped. From this date onwards patient progressed favourably, and got up on January 22nd. On January 23rd the temperature and pulse were normal, and the urine was free from albumen and sugar. The patient stated that she felt weaker after this confinement than she had done after any of her previous ones. All her earlier labours and puerperia were normal. A tonic was prescribed, and the woman is now quite well.

The father had had an attack of gonorrhœa two years previously. He was the ninth of ten children, and had five brothers and four sisters. His mother was alive and well, but his father died of consumption during middle life.

With regard to the family history of the mother of the dropsical infant, her father and mother died a few years ago, the former from inflammation of the lungs, the latter from bronchitis. Her married aunt had had difficult labours, all of which were instrumental; in one of her pregnancies she had suffered from "water on the womb," and in that case the infant was premature and still-born.

## B. Morbid Anatomy.

### I. Of the Fœtus.

*Measurements and External Appearances.*—The infant, a female, had a total length of 41 cms., and the distance from vertex to symphysis pubis was 29·5 cms. The weight was 2225 grammes (nearly 5 lbs.), and Dr Williams tells me that at the time of birth it was about 6 lbs. The circumference of the head in the O.F. plane was 29·5 cms., in the O.M. 33 cms., and in the s.O.B. 30 cms. The circumference of the thorax under the axillæ was 31 cms.; that of the abdomen a little above the level of the umbilicus was 37·5 cms., and at the navel it was 34 cms. The distance from the ensiform cartillage to the insertion of the umbilical cord was 9·5 cms., and that from the latter to the symphysis pubis was 6 cms. The transverse diameter of the abdomen was 13·7 cms. The thigh measured 12 cms. in circumference, and the leg 9·5; the upper arm measured 8·5 cms., and the forearm 7·5 cms. The measurements on the two sides of the body were practically the same.

In its external appearances this fœtus very closely resembled that described and figured by me in the *Edinburgh Medical Journal* for July 1892. The skin all over the body had a dusky-reddish

hue. There was general œdema of the subcutaneous tissue; but the anasarca was specially evident in the face, feet, and hands. The natural lines on the face and at the joints of the limbs were all deepened, and the ears were crumpled and deformed from œdema. The abdomen was distended, and fluctuation could be readily made out. The epidermis was detached in places in the hypogastric region; but there were no other signs of maceration. The attached portion of umbilical cord was swollen and of a pure white colour. The labia, especially the labia minora, and the clitoris were greatly swollen with œdema, and had a purplish colour. The anus was gaping. The infant was well formed, and its only morbid appearances were evidently all due to the anasarca.

*Appearances found on Dissection.*—On reflecting the skin of the scalp it was found that a large subaponeurotic cephalhæmatoma covered the greater part of the vertex. It was not limited to one bone, but was situated on both parietals, on the frontal, and on the supra-occiput, and crossed the sutures. The source of the hæmorrhage was not found. The left parietal bone was considerably depressed beneath the right at the sagittal suture, and it was also overlapped by the occiput at the lambdoidal suture. The bones of the cranial vault and base were normal in appearance. The face showed, on dissection, no abnormality save that caused by the subcutaneous œdema. The sucking-pads, tongue, tonsils, uvula, trachea, pharynx, thyroid gland, and nasal passages all presented the usual appearances. The ossification of the spine was not so far advanced as in a full-time healthy infant; but there was no spina-bifida, and no excess of cerebro-spinal fluid. The brain and spinal cord were perhaps more brightly white in colour than is normal. The sternum showed only two small ossific nuclei, one in the manubrium and the other in the body of the bone. There were a few cub. cms. of clear yellow fluid in the pleural and pericardial sacs. The heart weighed 19 grms.; the left ventricular wall was 7 mms. in thickness, and the right 5 mms.; the foramen ovale was widely patent, and so was the ductus arteriosus; the pulmonary valves were slightly thickened, and the other valves and apertures were normal. The thymus gland weighed 8 grms., was of a pale pink colour, and it measured 4 cms. vertically and 3·5 cms. transversely at its widest part. The lungs were unexpanded, and showed on section some small hæmorrhagic foci; the right lung weighed 15 grms., and had a vertical measurement of 4·8 cms. and a transverse of 4·5 cms.; the left weighed 12 grms., had a vertical diameter of 5 and a transverse of 4 cms. No trace of the thoracic duct was found in the thorax, and it may safely be said that it did not exist in its normal position. The great vessels of the thorax did not, however, show any abnormality.

When an incision was made into the abdomen it was seen that its cavity contained a large quantity (375 cub. cms.) of straw-yellow fluid, which had a sp. gr. of 1017 and a faintly acid reaction. It

contained on analysis 2·46 per cent. of total proteids; 1·36 per cent. being serum albumin, and 1·10 per cent. serum globulin.[1] The abdominal wall was 1 cm. in thickness near the umbilicus; the subcutaneous tissue was very œdematous. When the abdominal fluid, in which there was a large pale coloured flocculum of lymph, was allowed to escape, the viscera were seen to be disposed as follows:—The greater mass of the intestines was situated at a high level in the neighbourhood of the stomach and liver. The only viscera in the lower part of the abdomen were the uterus and annexa lying at the pelvic brim, the rectum lying behind them, and the sigmoid flexure forming a large loop just above the inlet of the pelvis. The rectum and sigmoid flexure were greatly distended with dark-green meconium, but the rest of the large intestine showed a greatly contracted lumen, and contained little or no meconium. The caput cæcum and appendix vermiformis were not found in their normal position, but lay at a high level in the abdomen, and were adherent to the under surface of the liver, just over the gall-bladder. From this point the colon passed transversely to the neighbourhood of the spleen, from which organ it passed downwards in a somewhat wandering manner, forming several curves upon the lateral and posterior part of the abdominal wall, to which it was closely adherent. There was therefore no ascending colon in its usual situation, but there was a short portion of bowel in the position of the transverse colon, and a descending colon much longer than normal. Glands were distinctly visible in the mesentery, which was short and somewhat thickened. The peritoneal aspect of the abdominal walls was white and glistening, and here and there a delicate pink tracery of underlying vessels could be seen.

The liver had a somewhat purplish colour; it weighed 110 grms., and had a vertical measurement of 7 cms. and a transverse of 10 cms. The spleen also was congested in appearance; was firm in consistence; had a weight of 11 grms.; vertical measurement 4 cms.; transverse diameter 2·2 cms.; and showed three notches, one of which passed across the whole of its anterior surface. The pancreas was 3·5 cms. in length, weighed 6 grms., and had a markedly pale appearance. Each kidney weighed 9 grms., and each had a transverse diameter of 2 cms.; the right had a vertical measurement of 3·5 cms., and the left one of 3·3 cms. The kidneys were in their normal position, and above them lay the suprarenal capsules. The right adrenal weighed 5 grms. and the left 4 grms.; the right measured 1·8 cm. vertically and the left 1·6 cm.; both had a transverse measurement at the base of 2 cms. No trace of the abdominal portion of the thoracic duct was found in its usual position. The urinary bladder contained no urine; it was pale in colour, but not otherwise abnormal.

With regard to the bones, there was no ossific nucleus in the

[1] This analysis was kindly undertaken for me by Dr Noël Paton.

lower end of the femur or in the upper end of the tibia, for the infant was not full time; otherwise the osseous system was normal.

*Microscopic Appearances.*—Most of the important viscera were examined microscopically, and showed very much the same appearances as in the cases previously described by me (*vide The Diseases and Deformities of the Fœtus*, vol. i. pp. 114 and 120).

II. Of the Placenta.

Dr Williams reported that the placenta weighed 2 lbs. It was œdematous and friable, and showed on section two small hæmorrhagic infarcts. The cord measured 12 inches in length, and was very thick and œdematous.

Specimen II.

A. *Clinical History.*—On January 11th, 1893, Professor A. R. Simpson kindly handed to me for dissection a very typical specimen of general fœtal dropsy, which had been sent to him by Dr F. W. Mann of Ashton-under-Lyne. Dr Mann furnished me with the following clinical details:—

The mother was 28 years old, and had been married at the age of 17. She had had the ordinary diseases of childhood. Menstruation was regular, but for some time there had been a leucorrhœal discharge. She was an viii.-para. Her first and second pregnancies ended in the birth of living children, both of whom are now alive, the first being 9 years old and the second 7 years and 8 months. The third, fourth, and fifth pregnancies also resulted in living children, but the third child died in three weeks, the fourth in six weeks, and the fifth in twelve months; no certain cause of death could be ascertained. The sixth child is now living, and is 3 years old; the seventh died when 3 months old. The present (her eighth) pregnancy ended prematurely between the seventh and eighth months, for the patient last menstruated about the end of May 1892, and the confinement took place on January 10th, 1893. When about two months pregnant the mother got a fright from a delirious man, who seized her, knocked her down, and sat upon her. The child presented by the right foot, and when Dr Mann was summoned he found both feet down, and the sacrum of the infant lying against the symphysis pubis of the mother. The child was born easily; but it could not be resuscitated. The placenta did not come away naturally, and as some hæmorrhage set in, it had to be expelled by the Credé method. Dr Mann was not permitted to keep the placenta for examination. The mother's recovery was complete. She had never before had a premature confinement, or had had abortions.

She has two sisters, ages 30 and 34; both are healthy, are married, and have healthy children. She had no brothers. Her mother never gave birth to a dropsical infant.

B. *Morbid Anatomy.*

*Measurements and External Appearances.*—The infant, a male, had a total length, with the legs extended, of 40 cms., and the distance from the vertex to the symphysis pubis was 30 cms. The weight was 1860 grms. (a little over 4 lbs.), but this was no doubt much less than what it was at the time of birth, for the cotton wool in which the child had been packed was soaked with fluid. The circumference of the head in the O.F. plane was 30 cms., in the O.M. 35 cms., and the height of the head was 12 cms. The circumference of the thorax under the axillæ was 30 cms.; that of the abdomen, at a point a little above the umbilicus, was 34 cms., whilst at the navel it was 33 cms. The thigh measured 11 cms. in circumference, and the leg 8·5 cms.; the upper arm measured 8 cms., and the forearm 7·5 cms. in circumference.

The external appearances of this fœtus were very characteristic, and the anasarca was greater than in any specimen previously examined by me. The colour of the skin of the head, trunk, and upper limbs was pale yellow, and these parts had a glistening aspect; that of the integument of the lower limbs, and also to some extent of the external genitals, was dusky red. This difference in colour was probably due to the fact that the fœtus had presented by the feet. The tissue of the scalp was enormously swollen with œdema, so much so that the underlying bones could not be felt. It was at first thought that the cranial vault-bones were absent, but subsequent dissection showed that this was not so, and proved that the fluctuating sensation was due to the greatly thickened and enormously œdematous layer of subcutaneous tissue. The fluid was not contained in cysts, for it was found that if the fœtus were left for some hours lying on one side, it gravitated to the parts lying lowermost, leaving the upper surface comparatively free from anasarca.

The face was greatly deformed by the œdema. There was one large fluctuating swelling just above the root of the nose, and at the sides were two somewhat smaller tumours overhanging the eyes. The cheeks formed two large swellings, in the hollow between which were seen the nose and mouth. Subcutaneous œdema in the lower part of the face gave the infant a well-marked double chin. A deep transverse furrow crossed the face, passing between the frontal swellings and those caused by the cheeks; the eyes lay quite hidden from view at the bottom of this sulcus. A vertical furrow ran downwards in the middle line from the root of the nose to the symphysis menti, and in this were the nose and mouth. The nose was pug-shaped, and the mouth was curiously contorted, so that the upper lip formed a narrow arch. Both the upper and lower limbs showed œdema, but that affecting the latter was much more marked, the legs resembling sacs of fluid. The abdomen was greatly distended. The scrotum and penis were œdematous; no testicles could be felt in the former. The anus was gaping. The

attached stump of the umbilical cord measured 4 cms. in length; it contained two arteries and a vein, and was pale in colour and gelatinous in consistence. The placenta came away in about half a dozen pieces. Dr Mann was unfortunately unable to secure it for examination.

*Appearances found on Dissection.*—Under the skin of the head, and external to the pericranium, was a thick layer of gelatinous cellular tissue, which was at some places blood-stained. The bones of the cranial vault were not moulded, and there were no signs of hydrocephalus; in fact, the anterior fontanelle only measured about 1·5 cm. by 1 cm. The osseous cranium was narrow from side to side, its maximum transverse diameter being only 5·5 cms.; the maximum antero-posterior measurement was 9 cms. The circumference of the osseous cranium was 22 cms., while that of the head with the soft parts *in situ* was 30 cms. The brain showed no abnormality in the arrangement of the sulci and convolutions, but it had a markedly anæmic appearance; the cranial nerves were normal. The spinal column showed the degree of ossification found at the period of fœtal life arrived at in this case. With the exception of the deforming œdema, the structures of the face showed no anomaly. Within the thorax a few cub. cms. of clear straw-yellow fluid were found in the pleural and pericardial sacs. The heart weighed 12·5 grms., and had a vertical measurement of 4·5 cms. A small quantity of pale red clot was found in the ventricles, and the auricles were rather small. The foramen ovale was closed by membrane in about four-fifths of its extent. The cardiac apertures and valves and the ductus arteriosus were normal. The lungs were quite fœtal in appearance, and weighed 7 grms., and the right had a vertical diameter of 4·5 cms., the left one of 4 cms. The thymus was somewhat small. The thoracic duct was not found in its normal position. When the abdomen was opened, 430 cb. cms. of dark straw-coloured fluid escaped. It had a sp. gr. of 1017, and a faintly acid reaction; the percentage of proteids was 1·69, of which 1·28 consisted of serum albumen, and ·41 of serum globulin; and the darker tint which this fluid had was due to the bile pigments found in it.[1] When the peritoneal fluid had been drawn off, it was seen that, as in Specimen I., so here, the abdominal viscera lay in the upper part of the cavity, leaving the lower part empty. The peritoneal surface of the abdominal walls had a yellowish glistening appearance, with here and there pink streaks denoting the underlying blood-vessels; on each side a special bundle of such streaks passed downwards from the neighbourhood of the kidney to the internal abdominal ring, where lay the testicle. The ureters could be seen passing to the bladder, whilst the descending colon was visible making a wide sweep along the lateral and posterior abdominal walls, and being in all its course closely adherent to the walls as

[1] As in Specimen I., Dr Noël Paton kindly made the above analysis for me.

if glued to them. The sigmoid flexure was also closely adherent, and the rectum passed downwards into the pelvis in the usual fashion. All the above-mentioned parts were at once visible without any dissection, for the fluid in the abdomen had floated the intestines upwards into the neighbourhood of the liver. The ascending colon was short, for the caput cæcum and vermiform appendix lay under cover of the right lobe of the liver, and were firmly bound to the peritoneum at the level of the hilum of the right kidney. The transverse colon lay very near to the lower border of the stomach, and the course of the descending colon has already been described. All the coils of the small intestine were found at a high level in the abdomen ; they were not adherent to each other, but from the contracted character of the mesentery they all lay very near each other in one packet. No part of either large or small intestine was distended with meconium ; the whole gut was of practically uniform calibre, and had a somewhat contracted lumen. The liver weighed 108 grms., and it had a transverse diameter of 10 cms. and a vertical of 7 cms. In one particular it differed markedly from the same organ in Specimen I., for in cutting into it no blood flowed out, and scarcely any escaped from the inferior vena cava and hepatic veins when they were opened into ; the liver, therefore, was very anæmic. The spleen weighed 19 grms., was congested, had a friable consistence, and measured 6·5 cms. vertically and 3·5 cms. transversely. The pancreas weighed 3·5 grms., and measured 2·8 cms. in length. The kidneys each weighed 7 grms. ; the right had a vertical diameter of 3·5 cms. and a transverse of 2 cms., and the left a vertical of 3·3 cms. and a transvere of 2·3 cms. The weight of each adrenal was 4 grms. ; the right measured 2·3 cms. vertically and 1·8 cm. transversely at its base, and the left 2·5 cms. and 2 cms. All the abdominal viscera except the spleen were strikingly pale and anæmic. The mesentery contained glands about the size of a pinhead and of a firm consistence, but no trace of the thoracic duct was to be found in the abdomen. The osseous system was as well developed as is usual in a seven months' fœtus, but the muscles were very poorly developed.

*Microscopic Appearances.*—The microscopic characters resembled those in the first specimen, but the anæmic condition of the organs was even more marked.

### *General Remarks.*

I have elsewhere so fully discussed the nature of general fœtal dropsy that I need here only point out one or two of the most important points raised by the examination of these two specimens. In both I found no trace of the thoracic duct. The only specimen in the human subject in which this fact has previously been noted was that described by Smith and Birmingham (*Journal of Anatomy and Physiology*, vol. xxiii. p. 532, 1889) ; but in that

case the morbid fœtus was one of twins, whilst both the above examples were the result of single pregnancies. It would seem, therefore, that absence of the thoracic duct may be the causal factor in single as well as twin fœtuses.

Another point of some importance was the proportion of proteids in the peritoneal fluid, which was markedly greater than in the case previously recorded by me. It was 2·46 per cent. and 1·69 per cent. in the two cases just narrated, and only ·087 per cent. in that reported in last year's *Transactions*. It may be found that there is in this circumstance a means of determining the character of the dropsy, the higher percentages indicating the obstructive and the lower the hydræmic or cachectic form.

The maternal albuminuria and anasarca which were present in Dr Williams' case seem to have been not the cause, but the consequence of the fœtal disease and the hydramnios.

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*The President* said that Dr Ballantyne's contributions opened up some interesting physiological problems. The absence of the thoracic duct in the two cases of fœtal dropsy led one to think that possibly lymphatic absorption was carried on under normal circumstances in fœtal life, else why should the absence of the duct produce such a markedly morbid condition as universal dropsy? With regard to Dr Ballantyne's contribution to the subject of allantoido-angiopagous twins, he was struck by what he had said with regard to their mode of origin. The idea that the acardiac one was originally so malformed as to be incapable of carrying on life without the help of the normal twin seemed to show that in teratology, as in biology, the survival of the fittest was not the only determining factor in the struggle for life; there might also be self-sacrifice of the originally weak. With regard to the circulation in acardiacs, it might be that the better developed specimens received blood direct from the placenta through the umbilical vein, whilst the less developed only got it through the arteries of the normal fœtus after it had already parted with much of its oxygen.

*Dr Ballantyne* replied.

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## MEETING VII.—JUNE 14, 1893.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr J. W. Ballantyne* showed—(*a.*) A water-colour drawing of a mesial sagittal section of a MACERATED MALE FŒTUS that had been handed to him for examination by Dr A. T. Sloan. The labour occurred on February 27th, 1893. When Dr Sloan arrived at the case he found a hand protruding from the mother's vagina and

the shoulder impacted in the pelvis, which was smaller than normal. He noted that the child was dead and macerated, and that its parts were soft, and so, although he did not succeed in pushing up the prolapsed arm, he managed to get hold of the other arm, and by traction drew the fœtus from the maternal passages, the head being, he thinks, deeply flexed on the chest. The infant appeared as if it had been dead for about a fortnight. The epidermis was absent everywhere save on the palms of the hands, the soles of the feet, the thighs, and the upper arms. Save in these situations, therefore, the red skin was exposed to view. In length the infant measured 55 cms., and the trunk alone measured 40 cms. The sagittal mesial section revealed the following changes characteristic of intra-uterine death:—Antero-posterior flattening of head and trunk, vertical elongation of head, presence of sanguinolent fluid in pericardium, and infiltration of the subcutaneous tissue with the same kind of fluid, diffluent state of brain, and considerable blood-stained effusion under the scalp. There was also great lateral deviation of the spine in the upper dorsal region.

(*b.*) Ten water-colour drawings of various sections of a LARGE STILL-BORN MALE INFANT, for which he was also indebted to Dr A. T. Sloan. The mother had had three children in the country, all large and well developed, but all still-born. In her fourth pregnancy she came to Edinburgh to be under the care of Dr Sloan. Labour supervened on April 6th, 1893,—according to the woman's reckoning, three weeks after the full term. There was some delay from the large size of the infant, and the use of forceps was necessary to deliver the child, which was still-born, and could not be resuscitated, although attempts were made for a long time. The placenta was normal; so was the mother's pelvis. Dr Sloan had sent the infant to him for dissection, in the hope of discovering the cause of the repeated still-births. The infant was so well developed and so mature in appearance that it resembled more a baby of several months than a new-born child. Its weight was 4780 grammes; the length from vertex to heel was 56 cms., and from vertex to symphysis pubis 36·5 cms. The circumference of the head in the O.F. plane was 38·5 cms., in the O.M. 42·5 cms., and in the s.O.B. 37 cms. The circumference of the trunk ronud the shoulders was 43·5 cms., at the level of the nipples 36 cms., at that of the ensiform cartilage 40 cms., at that of the umbilicus 37 cms., and at a level an inch above the last named 39 cms. The thigh measured 19 cms. in girth, the leg 13·5 cms., the upper arm 13 cms., and the forearm 11·5 cms. The infant was therefore a large one; but its size alone was not such as to prevent its safe passage through a normal pelvis. The head, however, when viewed from above, was seen to be more nearly square than ovoid in shape, and on closer examination it was found that the anterior fontanelle was scarcely larger than a threepenny piece, and that all the bones were unusually well ossified and nearly immovable

at the sutures, but the occiput felt loose in its attachments. The infant was put in the freezing mixture, and sections were then made of it,—one mesial sagittal in the region of the head, and nine horizontal at various levels in the trunk. It was found that some hæmorrhage had taken place into the falx cerebri and tentorium, and that the upper part of the occiput was separated from the basilar part and from the occipitals and displaced inwards. There had been a fracture of the bone at the so-called "cartilaginous hinge," which was in this case ossified. The vertebral canal contained a large quantity of blood, which surrounded the spinal cord in its entire extent. The foramen ovale was nearly closed. The transverse sections showed that all the organs were well developed and normal. The bladder was distended with urine, and bulged downwards in front of the symphysis pubis. Dr Ballantyne had no doubt that the still-birth was due to the premature ossification of the head, and to the fracture of the occiput which had resulted from it. He had advised that in any future pregnancy that might occur labour should be induced at the eighth month, in order, if possible, to avoid the above results and secure the birth of a living infant.

(*c.*) A FEMALE FŒTUS WITH RETROFLEXION OF THE VERTEBRAL COLUMN AND SPINA BIFIDA, which had been given to him for dissection by Dr W. N. Elder, who had also kindly furnished him with the following clinical details:—The mother was a woman of small stature, 31 years of age, who had enjoyed good health all her life. She was married when 25 years old, and fifteen months afterwards (May 8th, 1883) was delivered of her first child, a female. The presentation was a footling, and presented no exceptional difficulty. The infant had a spina bifida, the tumour being the size of a small orange, and situated between the last dorsal and the first lumbar vertebra. On May 2nd, 1887, she was delivered of a boy, and on August 31st, 1889, she had a second boy; both these children are still alive, and are healthy and well formed. In her fourth pregnancy, of which the specimen shown was the result, labour pains came on on July 21st, 1892. Dr Elder saw her on the morning of the 22nd, and found the cervix fully dilated, the membranes unruptured but very tense, and the abdomen much distended and as tight as a drum. A foot presented. The membranes were ruptured, and then a great discharge of liquor amnii took place (from 6 to 8 quarts). After some trouble the child was delivered by traction, the difficulty being caused by the great size of the head compared with the smallness of the limbs, which were also so delicate as to cause apprehension lest they should part from the trunk. The mother made a good recovery; the infant was still-born. With regard to family history, the mother's mother twice gave birth to twins, she being the younger of the second two. The father was a healthy man, and his mother had once had twins. The infant, a female, measured

30 cms. in length, and 19 cms. from vertex to coccyx. The circumference of the head in the O.F. plane was 31 cms., and in the O.M. 34 cms. The face had a natural appearance, and there were numerous hairs on the scalp, but the whole head was sharply flexed backwards on the trunk, so that the occiput came into close relation with the open spinal canal in the lumbar region. There was no indication of a neck anteriorly, the skin passing directly from the chin to the thorax. There was no umbilical hernia, but the abdomen was very prominent. A sagittal mesial frozen section of the infant was made, when it was seen that the spine ran upwards and forwards towards the centre of the fœtal mass. Several of the dorsal and lumbar vertebræ were absent. The abdominal organs, especially the liver, were pressed downwards and forwards.

(*d.*) A sagittal section of an INIENCEPHALIC FEMALE FŒTUS, which had come into his possession some time ago, but of which he had never, unfortunately, obtained the clinical history. Its length was 23 cms., that of the body alone being 14 cms. The head and trunk formed a single rounded body, measuring from 12 to 13 cms. in its antero-posterior diameters. The head was sharply flexed backwards, so that the skin covering its posterior surface was directly continuous with that lying over the coccyx. The occiput was, as in the previous specimen, defective in its lower part. The spine showed a much smaller number of vertebral bodies than is normal, and had an upward and forward direction passing through the centre of the fused head and trunk mass. The face looked directly upwards. The thoracic and abdominal viscera were displaced downwards and forwards, but there was no exomphalos. This specimen, along with the previous one, illustrated very well the manner in which such a monstrosity was developed, the successive stages being in all probability spina bifida, retroflexion of the head, and adhesion of the occipital part of the head to the region of the sacral or coccygeal spine.

(*e.*) A drawing of a TUBO-OVARIAN CYST AND OVARIAN CONCRETIONS, which Dr J. D. Williams (Dowlais) and he had examined some time ago. The specimen was obtained from the post-mortem room of the Infirmary, where it was taken from the body of a woman, 50 years of age, a widow, who had died of septicæmia after the excision of the left breast for cancer. She had never been pregnant, and her menstrual flow had always been scanty and accompanied by pain, which disappeared two days after the flow came on. She had mitral and tricuspid incompetence, and there were abundant signs of chronic pelvic peritonitis. The uterus was bound by adhesions to the rectum, sigmoid flexure, and posterior pelvic wall, so that there was no pouch of Douglas; it was also adherent to the bladder. The cervix uteri was conical in form, with a pin-hole os. The left Fallopian tube was much atrophied; its outer end was dilated to form a bean-sized hydrosalpinx, which was situated amidst a cluster of pea-sized cysts placed at the outer

end of the left ovary, and both tube and ovary were covered by numerous adhesions binding them to the sigmoid flexure. The left ovary, which was small, contained a bony nodule in its posterior border. The right Fallopian tube, like its fellow of the opposite side, was very thin and atrophic; it ended externally in an enlargement, which was found to consist in part of the dilated tube, and in part of a marble-sized ovarian cyst; this was the tubo-ovarian cyst, and it measured 1·2 cm. in diameter, and contained limpid fluid. The tube and ovary were covered with membranous adhesions, and the inner third of the tube was glued to the posterior bladder wall. Two marble-sized cysts were found in the ovary growing from the hilum, with one of which the dilated end of the tube was continuous. This cyst arose from the paroophoron, and a probe could be passed from it into the end of the Fallopian tube for a short distance. The tubal fimbriæ did not project into the cyst cavity, but were blended with its walls, and the tubal folds were seen flattened out on the interior of the cyst lying near the tube. The lining membrane of the cyst was not smooth, but was covered with numerous papillary projections. No ciliated cells were seen, but there were round or irregular cells, not columnar or cubical. Muscle fibres were found in the wall of the cyst lying next the tube, but not in the outer portion. At each end of the ovary, and lying in its substance, was a hard smooth nodule about the size of a pea, in structure resembling bone. A similar nodule was found in the broad ligament immediately below the ovary. These bodies differed in several particulars from the ovarian concretions described by Mackenzie (*Trans. Path. Soc. Lond.*, vol. xl. p. 198). This specimen seemed to be one of so-called tubo-ovarian cyst, and not of ovarian hydrocele; and both Dr Williams and he thought it was due to the absorption of intervening tissue, the wall of the hydrosalpinx and that of the ovarian cyst having been kept in close contact by peritoneal adhesions. The condition on the left side was interesting, and seemed to support the above conclusion.

II. *Dr Matheson Cullen* showed a specimen of PLACENTAL DISEASE. The placenta was from a ii.-para, who was delivered of a dead child at the eighth month. The maternal surface was entirely white, and gave one an impression as if it had been completely covered with lard. The fœtus had apparently been dead for some weeks, and was in a macerated condition, and no dissection of it was allowed. The mother had enjoyed the best of health during the course of the pregnancy, and the labour was rapid and easy. After her last confinement she was laid up for some time with symptoms suggestive of endometritis; there was no history or suspicion of syphilis. Whether the condition was anterior to or consequent upon the death of the fœtus it was impossible to say. A microscopic examination would be made which might further elucidate the case.

III. *Dr Felkin* showed—(*a.*) AN INDIA-RUBBER BALL, 3½ inches in diameter, which was almost filled with 5¾ lbs. of shot. He used the ball in the treatment of chronic constipation, anæmia, and obesity, and he found it much more convenient than either the celluloid ball or the canvas ball, which were usually employed for the purpose. The ball was instructed to be rolled from right to left round the abdomen for five or ten minutes night and morning. One of his patients had lost 10 inches in girth after five months' regular use of it. A rather smaller ball, with a less quantity of shot, he found very useful in inducing a regular action of the bowels in young girls who so frequently suffer from habitual constipation; this plan obviated the need for constant dosing.

(*b.*) A photograph of a case of ACCIDENTAL VACCINATION in an unusual position, namely, on the knee. He vaccinated a girl, G. F., who was aged 9, on the 14th February last. She only took slightly, but seven days thereafter a very well-marked vaccine vesicle appeared upon the knee. Her sister, aged 7, who was vaccinated at the same time, did not take, but she also had a fairly well-marked vaccine vesicle upon the thigh. Dr Felkin had had two other cases of accidental vaccination. He vaccinated Mrs S.'s child on the 2nd of February, and on the 13th he found that she herself had a well-marked vesicle situated just over the pisiform bone on the right wrist. A neighbour's child, C. L., aged 14, had likewise been inoculated on the right eyelid.

## IV. TUBO-OVARIAN DISEASE: TWO ILLUSTRATIVE CASES, CLINICAL AND PATHOLOGICAL.

By J. STUART NAIRNE, F.F.P.S. Glasg., and ANTHONY MILROY, M.D.

MR PRESIDENT AND GENTLEMEN,—I have ventured to bring these two cases before you for the following reasons:—

1. There is a very fairly complete history of the cases previous to operation.
2. There is a radical difference in the treatment adopted in each case.
3. A considerable time has elapsed since the operations, and we have the conditions of the patients up to date.
4. We have a very complete pathological report from Dr Milroy on one of the cases.
5. I, for one, would be all the better for more light with regard to diagnosis, prognosis, and treatment, and I hope to get it here.

The first case is that of Mrs M'F. Her history previous to coming under observation at this time is as follows, carefully drawn up by Dr Alex. Nairne:—

"Mrs M'F., æt. 34; married 24th October 1890; husband alive; never pregnant; began to menstruate at 14 years of age. Menstruated profusely every fortnight or so, the menstrual fluid

being very dark in colour. Had a fever when five or six years of age on the passage home from Malta, whither she had been taken as a soldier's daughter. Twelve years ago, whilst menstruating, waded across a burn, milked some cows, and waded back again, with the result that her menses stopped for fourteen months. After that was fairly well, changing presumably regularly up till two years ago, when she was seized with sudden pain, which she thought cramp, but which continued; and she was laid up with a severe illness for six weeks. She recovered from this, and was again well enough up till the end of June 1891, when she was again seized in a similar manner, and Dr Moffat and Dr Halket were called in to see her."

The following letter from Dr Moffat gives the condition of the patient when he saw her:—

"11 WALWORTH TERRACE, GLASGOW, W.,
*20th January* 1892.

"DEAR SIR,—I received a note from the matron of the Samaritan Hospital asking me to send you anything of importance in the history of Mrs M'F.

"What I know of the case is very little, having only attended her for two days. I was called to see her at her home in Cheapside Street, and found her suffering from vomiting, cold shiverings, and complaining of pain in the abdomen. On examination I found a large swelling above the pubis, which I at once took for a distended bladder. I called in about an hour afterwards, and passed a catheter, but only got away about half an ounce of urine. I then ordered a half-grain morphia suppository, and called next morning along with Dr Halket, who put the patient under chloroform. I then passed a trocar into the tumour, and got away about three pints of pus.

"As the woman had no one to attend her, and no home comforts, I advised her friends to get her away at once to the hospital.
—Yours truly, DAVID MOFFAT."

On admission to hospital a rounded tumour, closely simulating a distended urinary bladder, was found lying over the pubis, covering the middle line and extending into the left iliac fossa, but not into the right. I think that description conveys sufficiently distinctly that it was really a left-sided tumour whose right border extended over the middle perpendicular line of the body.

Examination per vaginam disclosed the right vaginal roof low, resistant, and evidently with the uterus flexed *right* laterally. The left side of the vaginal roof was full, tense, partly having a feeling of resilience, and movable by the motion of the tumour. The tumour seemed the size of a child's head, and was so anomalous to touch and movement that the diagnosis wavered between that of a suppurating ovarian cyst and that of a huge suppurating

Fallopian tube. Of course, we knew already from Dr Moffat's report that some three pints of pus had been abstracted, so that there must be an abscess cavity of some sort was evident.

Ultimately we resolved on "ovarian abscess," with adhesion to the left broad ligament. Practically this was almost a perfect diagnosis; for it was an ovarian abscess, and there were adhesions along the broad ligament. But it was not anticipated that these adhesions consisted virtually of the opened-up Fallopian tube, or of that anatomical curiosity where tube and ovary and broad ligament became inseparable as parts of a tubo-ovarian cyst.

The details of the operations are unnecessary here. Suffice it to say that a complete hysterectomy was performed, the large open base of the left lateral ligament closed in by a continuous suture, and the stump fixed extra-peritoneally. She made a very easy and rapid recovery.

She has remained well ever since, excepting for occasional headaches; and at the present moment says she is in perfect health, and looks it.

The second case is that of Maggie S., æt. 26, and the following history is copied from the Journal:—

*Feb.* 13, 1892.—General diagnosis on inspection—solid tumour of uterus, probably sarcoma.

Menstruation lasts for a fortnight, with considerable loss of blood and great pain. Swelling in both iliac regions, that of left side much larger than that of right side. It is also larger when menstruating, and diminishes in size considerably when menstruation ceases. Commenced to menstruate when 13 years of age, and was regular up to 22 years of age. Has always been healthy, apart from present illness. Her father and mother are alive and healthy.

*Family.*—She has five sisters and two brothers alive and well. One brother, the first of the family, died in infancy. One brother and one sister older than herself.

Believes her present illness to be due to carrying heavy baskets of butter. The menstruation has become gradually more and more, till it comes now in clots, and lasts a fortnight. She then has usually a clear month before menstruation starts again, but during that time she has leucorrhœa. The pain in the left iliac region is very severe when menstruating, but does not entirely cease when menstruation stops. No pain in left (right?) iliac region. Has also pain in the back, lumbar region; worse when altering. Bowels costive, and have always been so. Micturition painful when menstruating; not so at other times. Has no appetite; this has been the case for a year back. During the time she menstruates she often has a squeamish feeling, and occasionally vomits. Sleeps fairly well. When menstruating the pain sometimes prevents sleep. Has noticed a swelling on the left side since May last, which has been steadily growing.

*Inspection.*—A large tumour is seen on the front of the abdomen, rising from the left side of the pelvis, extending as high up as the level of the umbilicus, and passing over to the right side to some extent.

She was admitted to Blythswood Hospital and operated upon on March 7, 1892. I shall not trouble you with details of this operation either, but merely state what it was.

In the previous case some doubt had been expressed and perhaps felt by myself, whether hysterectomy had been really necessary, and whether it would not in any subsequent cases be a much better plan to try something more conservative. Immediately on realizing the nature of the case I did so. I made the abdominal incision much larger in order to find room to work, because necessarily a tumour of this sort does not come readily forward. In this case it did not come forward at all, and I had to clip it out, working inconveniently far down in the pelvis. I stitched over the base as in the last instance, and drained. I left the uterus and the right appendages. This case was a long time in recovering. She had peritonitis, became septicæmic, and Dr Halket, who kindly saw her with me in consultation, did not expect her to recover. I did not expect her recovery myself. However, she got better, went off to the country, and seemed to regain her old health. In fact, she did remain well, at least feeling well, till quite recently.

I have just seen her. The uterus is fixed, enlarged; her menstruation is very profuse, at shortened intervals, and frequently clotted. Just before menstruation on the last few occasions she has had violent sickness, retching, and vomiting, and her skin and the whites of her eyes became jaundiced.

If I had made up my mind in this second case to do an hysterectomy, I could have probably done with a smaller incision, —at any rate, the same incision would have served my purpose. But I would then have been able to deal with the whole pelvic floor in a much more thorough manner; the operation would have been easier, more quickly performed, and I think the patient would have made a much more rapid recovery. I think, too, she would now have been quite well, instead of feeling, as she does, not just right; and, as I feel, not beyond the risk of requiring another operation.

Of course, I would not be so foolish as seek to lay down any laws for operation. Every single case will demand its own special treatment. But the question that emerges from a consideration of these two styles of treatment is a very plain and important one, viz.,—Is it easier and better, as a rule, where you have pus disease of one side of the pelvic floor, to work with the whole floor, or with that diseased half only?

I have only one word to add with regard to the nomenclature of the specimens, and that is a clinical one, viz., that I know that the specimens represent the whole of the appendages involved, that

the whole of the side and floor were cleared off, and that the ovary and tube must be represented by these specimens.

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*The President* expressed the gratification of the Society in seeing Dr Stuart Nairne at their meeting, and hearing him describe such interesting cases. So far as he (the President) could judge from the history of the patients and the appearance of the preparations, he was disposed to think that they were both cases of pyosalpinx. The first case was more difficult to analyze; but when a tube had got largely distended with pus, and inflammatory action was set up around, it was quite possible for the ovary to become flattened out and embedded among the adhesions. As to the treatment, Dr Nairne was to be congratulated on the success of the measures he had adopted; and the greater success of the first case showed the importance in such conditions of removing so much of the sexual organs as to prevent the further recurrence of menstrual changes. This was usually obtained by removal of the appendages of both sides. But removal of the uterus gave this result, and he would like to know if any of the Fellows had carried out the procedure suggested by Péan, and advocated by some of his fellow-countrymen, of digging out the uterus through the vaginal roof, and so getting access to pelvic abscesses as to drain and cure them.

*Dr J. W. Ballantyne* thought that if the microscopic examination showed that one part of the sac was distinctly tubal and the other distinctly ovarian in structure, the nature of the cyst would be settled. The specimen he had shown demonstrated at least one mode of origin of tubo-ovarian cysts.

*Dr Nairne* replied.

## V. ON THE EXTRA-PERITONEAL FORM OF EXTRA-UTERINE GESTATION.

By D. Berry Hart, M.D., Edinburgh.

In any extra-uterine gestation at or beyond the fourth month we have to determine one special point as to its nature, viz.,—Is the gestation intra-peritoneal or extra-peritoneal? The most generally held opinion hitherto has been that such gestations were intra-peritoneal, although the proof for this has been of the most vague character. There is no doubt that the fœtus is often intra-peritoneal, but that is no proof that the gestation is intra-peritoneal. The position of the placenta alone determines the nature of the gestation, and the attachment of placenta to the free surface of the peritoneum has never been demonstrated.

Evidence is now rapidly accumulating to the effect that extra-uterine gestation at or beyond the fourth month[1] is extra-

[1] I take this somewhat arbitrary date to exclude pure tubal and ovarian gestation.

peritoneal,—*i.e.*, while the fœtus may be intra-peritoneal or extra-peritoneal, the placenta is always extra-peritoneal.

The HISTORY of our knowledge of the extra-peritoneal gestation is a very remarkable one. Dezeimeris in 1836 published in the *Journal des Connaissances médico-chirurgicales* an article which, owing to some delay on his part, was refused admission to the *Dictionnaire de médecine*, for which it was originally written. In this article Dezeimeris first described the special variety of extra-peritoneal gestation under the name of "Grossesse sous-péritonéo-pelvienne." As this valuable memoir is very inaccessible, I have reprinted what Dezeimeris says in regard to this form.

"*Grossesse sous-péritonéo-pelvienne.*

"Je constitue sous ce nom un genre de grossesse extra-utérine, trop différent de tous ceux qui sont décrits dans les ouvrages dogmatiques, sous le rapport du siége de la grossesse, des lois de son développement, des indications thérapeutiques qu'elle peut fournir, pour qu'il soit permis de les confondre. J'ai voulu marquer par cette dénomination ses caractères les plus importants, savoir: son siége en dehors du péritoine, et son développement, son séjour dans la cavité pelvienne. Cette grossesse est le développement de l'œuf entre les feuillets du ligament large. J'en connais plusieurs exemples; les suivants suffisent pour en constater l'existence et le siége.

"Le docteur Loschge, professeur d'anatomie à Erlang, publia en 1818, dans les *Archives* de Horn, Nasse, etc., la relation d'un cas de grossesse extra-utérine; le fœtus, de l'âge de cinq mois, bien conformé, du sexe masculin, pourvu de ses membranes et de son placenta, fut trouvé dans l'épaisseur du ligament large. La dissection démontra que ce n'était ni une grossesse de la trompe, ni une grossesse de l'ovaire, mais que l'œuf s'était développé entre les feuillets du ligament large. Les parois du kyste s'étant déchirées à la partie inférieure, il s'en était suivi une hémorrhagie mortelle. Il n'y avait point de traces de l'existence d'une caduque dans l'utérus (*Archiv für die Erfahrung, etc., von Horn, Nasse und Henke*, 1818.—*Med. chir. Zeitung*, 1820, t. i. p. 380.)

"Je rapporterai un second cas de grossesse sous-péritonéo-pelvienne. On en sentira tout le poids quand je dirai que c'est Lobstein qui nous en a transmis la relation, et que la pièce se conserve encore dans le musée anatomique de la faculté de médecine de Strasbourg.

"Une dame, encore éloignée de quinze jours du terme de sa grossesse, sujette à une fièvre hectique, par suite d'une inflammation chronique du péritoine, ressentit les douleurs de l'accouchement, se trouvant déjà dans le dernier degré de l'épuisement: elle y succomba. L'opération césarienne fut faite à l'instant même, dans la vue de sauver l'enfant; mais il était trop tard. L'examen des parties génitales internes fit voir les particularités suivantes:

la matrice, plus volumineuse qu'à l'ordinaire, avait sept pouces de longueur, cinq pouces de largeur à son fond, et neuf lignes d'épaisseur dans ses parois; le plus grand diamètre de sa cavité était de trois pouces. Ici, comme cela a lieu dans les cas de grossesse extra-utérine, l'intérieur de la matrice était tapissé de la membrane caduque. Au côté gauche de la matrice se trouvait un vaste sac qui servait de réservoir au fœtus; ce sac était adhérent à tout ce côté de la matrice, depuis son fond jusqu'à son col. Il avait une forme ronde et un diamètre de neuf pouces; mais ses parois n'avaient qu'une demi-ligne d'épaisseur. Ce réceptacle ou cette fausse matrice était placé *entre les feuillets du ligament large.* La trompe et le ligament de l'ovaire avaient gagné plus d'extension et plus d'ampleur; l'un et l'autre s'épanouissaient sur le kyste et étaient, pour ainsi dire, changés en un plan fibro-musculeux. On remarquait çà et là, à la surface du kyste, des fausses membranes celluleuses qui l'unissaient d'une manière lâche aux parties environnantes, et on voyait, de plus, sous sa tunique externe, des rameaux veineux parfaitement semblables à ceux qui rampent sur la membrane externe d'une matrice en état de gestation. Le sac lui-même était formé de deux feuillets membraneux, lisses et minces, contigus l'un à l'autre et laissant entre eux des espaces plus ou moins grands; la face interne de ce même sac était tapissée d'une couche de matière jaunâtre de nature fibrineuse, et qui l'unissait à la surface externe des membranes et du placenta. Celui-ci était encore en place et partout adhérent à la paroi postérieure du sac représentant la matrice. Il était en raquette, d'une forme ovalaire, et avait sept pouces dans son long diamètre et six pouces dans le petit; les vaisseaux formant les racines du cordon ombilical étaient extrêmement dilatés; quelques-uns avaient jusqu'à sept lignes de diamètre. Le placenta adhérait à la paroi postérieure du sac, de la même manière que s'il avait été attaché à la matrice, excepté que cette paroi était aussi mince que le reste du sac, qu'elle n'offrait aucun tissu spongieux. (Lobstein, *Compte rendu à la Faculté de Médecine de Strasbourg sur les travaux anatomiques, etc.*, Strasbourg, 1824, in-8°, p. 48.)

"Ces faits me paraissent suffisants pour légitimer l'admission d'une grossesse sous-péritonéo-pelvienne; d'une grossesse qui n'est ni ovarique, ni tubaire, et qui, si l'on peut s'exprimer ainsi, est moins abdominale qu'aucune autre, puisque, placée, au premier temps de son existence, en dehors du péritoine, les progrès de son développement ne paraissent point devoir l'y faire pénétrer, mais au contraire le ligament large, en se developpant à mesure que le produit de la conception grossit dans la cavité pelvienne, doit former une sorte de plancher qui l'y retient et qui lui ferme l'entrée dans la cavité abdominale. Je n'ai pas besoin de dire ici tout ce qu'il y a d'essentiel dans cette circonstance, et de signaler en ce moment l'importance pratique qui s'attache, précisément à cause d'elle, à l'étude de la grossesse sous-péritonéo-pelvienne,

comme espèce particulière de grossesse extra-utérine; nous aurons à revenir plus loin là-dessus. J'engagerai seulement le lecteur à examiner les cas nombreux que l'on possède de grossesses extra-utérines terminées par l'élimination du produit de la conception, soit par le vagin, soit par la voie des selles, et il lui sera facile de s'assurer que ceux de ces cas dans lesquels les désordres sont restés le plus exactement limités dans la cavité pelvienne, sont justement des grossesses de l'espèce dont nous nous occupons. Qu'on prenne la peine de lire, par exemple, l'observation de la femme Lefort, publiée par Bergeret dans le *Recueil périodique de la Société de médecine* (thermidor an x), ou par Baudeloque, dans son *Art des accouchements* (t. ii. p. 456–464, 6e édition), et il sera maintenant facile d'y reconnaître une grossesse sous-péritonéo-pelvienne. Le dernier de ces ouvrages est entre les mains de tout le monde, et il serait superflu de rapporter ici en raccourci une observation dont on peut y voir les détails.

"Je crois pouvoir citer aussi, comme cas de grossesse-sous-péritonéo-pelvienne, une observation de J. Major Wilson, qui sera donnée plus loin par extrait, mais dont je n'ai pas les détails sous la main.

"Si l'on veut relire l'observation publiée par Noël dans le tome ii. de l'ancien *Journal de médecine*, sous le titre de Grossesse vaginale, observation citée bien des fois depuis lors, mais toujours restée inintelligible, on y reconnaîtra, je pense, une grossesse sous-péritonéo-pelvienne, et il sera dès lors facile d'en comprendre tout le merveilleux.

"Je répète que la grossesse sous-péritonéo-pelvienne me parait n'être point une grossesse extra-utérine rare."

It will be seen from this that Dezeimeris bases the existence of this variety on two cases by Loschge of Erlangen and Lobstein, and he also draws attention to the frequency of the termination of extra-uterine gestation by elimination through the vagina and rectum. This account is so clear that it is a mystery that it attracted little or no attention for long.

In this country, as early as 1874, Mr Tait drew attention to Dezeimeris's views, and pointed out their great importance. In 1883, along with the late Dr Carter, I demonstrated by frozen sectional anatomy a broad ligament pregnancy, and also a full-time extra-uterine pregnancy, in an intact cadaver, and showed that in both the gestation was extra-peritoneal. Since then corroborative cases have been published by Griffiths, Bland Sutton, J. W. Taylor, and others.

In Germany a very comprehensive memoir has been published by Werth, and cases by Breisky, Schauta, Olshausen, and many others have been recorded. The last gives an account of several operative cases, and is very valuable.

I purpose now considering some points in the development of this extra-peritoneal form, specially in reference to—

(1.) *Its Anatomy in relation to the relative Positions of Fœtus and Placenta.*
(2.) *The Microscopical Anatomy of the Placenta;* and
(3.) *The Treatment in Special Cases.*

## (1.) *Its Anatomy in relation to the Relative Positions of Fœtus and Placenta.*

In the extra-peritoneal form we have the placenta developing in connective tissue, and a rapidly growing fœtus. The relations of these to one another are practically four, viz.:—*a.* The fœtus may lie above the placenta; *b.* The fœtus may lie below the placenta; *c.* The placenta may be in front, or *d,* behind the fœtus.[1] These relations are of the greatest importance. All extra-peritoneal gestations begin as tubal pregnancies. As the gestation grows the folds of the broad ligament are separated to accommodate the developing ovum, and in certain cases the peritoneum remains intact even in advanced gestation, and when rupture takes place the fœtus only escapes, as a rule, into the cavity (secondary gestation). The fœtus increases, however, much more in bulk than the placenta, and we get in those cases where the placenta lies above the fœtus a great displacement of the former, its conversion into blood-clot and blood crystals, death of the fœtus, and its discharge by bowel, etc.

When the relative position is such that the fœtus lies above, we get much less displacement; and where the placenta lies in front (or behind), comparatively little disturbance and a good placenta. One very important point in regard to the placenta is its relation to bowel. When near bowel it may decompose; in certain cases it does not decompose but becomes absorbed, and in such its proximity to bowel may be less dangerous. We are, however, as yet without accurate information as to this point.

In extra-peritoneal gestation a sac wall, more or less complete, may be present, and may contain unstriped muscle. A well-marked sac wall was present in Barbour's case, which was probably extra-peritoneal.

Drawings already published by me illustrate the points advanced. In certain cases the gestation has become more or less pediculated.

## (2.) *The Microscopical Anatomy of the Placenta.*

It is of importance, in the first place, to state my views as to the nature of the normal human placenta. Here, again, we have views advocated by authorities, deservedly high, which have led to error in regard to the extra-uterine placenta. For the formation of the necessary elements of the placenta we require, on the one hand, the fœtal villi; on the other, the metamorphosed mucous membrane of

[1] I have seen the relations in *a*, *b*, and *c*.

the uterus, the decidua serotina. The columnar epithelium of the latter has hitherto been regarded of importance, as it is supposed that the single layer of columnar cells covering the placenta in the later months is maternal, is derived from the serotinal free surface or from the glands, and that the fœtal epithelial covering has disappeared. The supposed necessity for an epithelial covering to the villi, not fœtal, but derived from the mother, has led to the supposition that in the so-called abdominal extra-uterine gestation the peritoneum formed the maternal part of the placenta, and that therefore in abdominal gestation the fertilized ovum passed into the peritoneal cavity, and found an admirable serotina in the peritoneum. Freund of Strassburg has satirized this well as follows:—

"Regarding the place of attachment of the fertilized ovum to the tissues outside the uterus, and regarding the structure of the placenta there, we have no addition to the old observations nor exact histological facts. After the noise as to the disputed possibility of ovarian and abdominal gestation has been settled by the incontrovertible fact of the existence of such pregnancies, nowadays the attempt has been made to represent the whole question of the ovum implantation and the placental formation on the various extra-uterine tissues as perfectly intelligible and in harmony with the newest histological views. Thus the theca folliculi is considered as a bed which contains the elements of a mucous membrane, and which is thus quite suited for the nidation of an ovulum. The placental formation on the peritoneum near the ovaries and tubes is held to be plausible in view of the fact that this region stands in a certain genetic relation with the germinal epithelium, and that this is necessarily only a process going on in a connective tissue substratum. Who feels here firm ground under his feet? Who would further maintain the correspondence of the implantation of the ovum on the peritoneum with the adhesions of foreign bodies and tumours in the abdominal cavity? Here surely other circumstances come under consideration. Those who delight in analogies may here advance the later and latest histogenetic views regarding the peritoneum. They may point out that in the amphioxus, lanceolatus, in the gephyrea and other animals, the whole peritoneal cavity, by means of its epithelium, takes part in the development of the ovum epithelium. Waldeyer and others, indeed, recently have affirmed the most internal covering of the peritoneum to be epithelium, which is supposed to have adapted itself to the changed condition and has morphologically altered. This epithelium would belong to the archiblasts like all epithelial muscle and nerve cells. As the peritoneum, according to this, approaches mucous membrane in structure, the attachment of the fertilized ovum is not contrary to reason. There even is, histologically, no cause for astonishment if a woman with a diaphragmatic hernia should have a fertilized

ovum nestled on the pleura, or, in the literal sense of the term, under the heart, or even in the pericardial sac, were that accessible, and, so far as is reconcilable with her respiration and circulation, should bring it to full development. Moreover, if any one gives rein to his fancy to have a say in earnest investigations he may unweariedly rise yet higher. The uterine milk, which has lately been recognised as an important link in the chain of organic devices for the nourishment of the child, and whether it be derived from the leucocytes or decidual cells, could just as well be imagined as being formed from the histological elements of the peritoneum. The rapid growth of the connective and vascular tissue of the maternal structures for the purpose of fixing and nourishing the ovum, when we look at the growth and nourishment of any living material introduced into the peritoneal cavity is, as it seems, a perfectly obvious phenomenon. For if we sum up all that is required on the mother's part for the commencement and continuation of pregnancy, we seek for nothing more than a comfortable, well-closed in nest of tissue, a continuous attachment for forty weeks, and for the purpose of respiration and nutrition of the fœtus a new development of bloodvessels in communication with the vascular system of the child; then the peritoneum appears in every particular remarkably adapted for this. The peritoneal cavity is just a favourite place for experimenters who wish to study the subject of transplantation of parts of tissue and even of entire organs. So the modern clinician might content himself as regards the occurrence and continuation of extra-uterine pregnancy with the histogenetic line of thought now stated. But this goes on the assumption that we here deal only with conclusions from analogy, and who does not know from many examples out of various departments of medicine how uncertain and deceptive such conclusions are?"

The comparative anatomy of the placenta has, however, shown that the early fertilized ovum in the hedgehog, rabbit, and other animals absorbs the columnar epithelium of the mucosa, and finds in the connective tissue elements the necessary basis for their serotina. In a recent research on the structure of the human placenta Dr Gulland and I came to the conclusion that the necessary elements for the placenta were, on the one hand, the fœtal villi, on the other the connective tissue of the serotina; that the covering of the villi was entirely and always fœtal, and that the villi at their tips had an active phagocytic action.

This agrees, as we shall see, with the needs of the placenta in extra-peritoneal gestation. In its early tubal stage we do not know what relation it bears to the epithelium, or whether, indeed, epithelium is present at the site of its earliest growth. In the later stages, however, it develops entirely in relation to connective tissue,—a development quite in accord with the opinions I have advanced as to the structure of the normal human placenta.

The main structure of the extra-peritoneal placenta depends on whether in its growth it is displaced or not. When not displaced, as in one of my cases, its structure, so far as the villi are concerned, is as perfect as that of a normal placenta. Any considerable amount of displacement alters this however, causes blood effusion and organization, so that in extreme cases the placenta may be a mass of blood crystals, organized connective tissue, and compressed and distorted villi.

I believe, then, that the extra-peritoneal development of the placenta is quite in accordance with modern views of the structure of the human placenta, and the belief that the extra-uterine placenta in advanced cases must develop on peritoneal epithelium quite unwarranted.

In the *treatment* of advanced extra-uterine gestation no hard and fast rule can be laid down. There is no doubt that operative treatment is indicated, and that all attempts to cure by means of electricity, morphia, etc., are effete, or should be. All are agreed that when abdominal section is performed the fœtus should be removed. The difficulty is to treat the placenta. If untouched it may give no trouble (Jessop, Braithwaite), but in most cases sets up sepsis when left. It may be possible to remove the entire gestation by ligature and partial enucleation (Breisky), or to enucleate the sac, as Olshausen recommends, after preliminary ligature of the ovarian and uterine arteries.

Another plan is to separate the placenta, but in many cases the hæmorrhage is so severe as to deter the operator. The case I now record shows, however, that this can be done with comparative safety when the iodoform tampon is employed, and that the placenta can be removed on successive days with advantage. Indeed, in certain cases I do not see why one should not incise the sac abdominally and remove the fœtus, plug the sac with iodoform gauze, and then remove the compressed placenta in two days or so.

The special case is as follows:—

## Case of Extra-uterine Extra-peritoneal Pregnancy Operated on at the Fourth Month.

My reason for narrating this case is not only its comparative rarity, but also the encouragement it gives to operative treatment in such.

During the night of the 11th January 1893 I was called to see Mrs A., who had been seized with sudden pain, faintness, and collapse. As I was aware she had passed two periods, I fully expected that a Fallopian-tube pregnancy had ruptured intra-peritoneally, but did not find on my arrival the collapse one would have expected. Internal examination was negative, and I therefore

administered a sedative and postponed examination under chloroform till next day.

I then found the uterus retroverted, enlarged, and lying to the left. There was no appreciable intra-peritoneal effusion nor hæmatoma, and I therefore abandoned all idea of ruptured gestation. I may mention here that the patient had one child six years old, and that during the pregnancy there was a sub-peritoneal fibroid about the size of an egg on the left side of the fundus. Any thickening I felt during this examination I attributed to this, and the stoutness of the patient also hindered investigation. Ten days afterwards there was some uterine hæmorrhage with dilated cervix, and I curetted away decidual shreds, but this I attributed to ordinary abortion.

The patient's condition did not improve after this. Spasmodic and severe pains came on, which I could only vaguely ascribe to renal or hepatic colic. During March, however, a tumour developed at the right iliac margin, gradually increased towards the middle line, so as to drive me to a reconsideration of the whole case.

The condition at the end of March was thus as follows:—There was amenorrhœa for about four and a half months; a history of collapse with shreddy discharge at the second month and occasional subsequent attacks of spasmodic pain; a tumour spreading from the right iliac fossa and now mesial, with its top two finger-breadths below the navel. Over the lower part of this tumour a bruit could be heard, and milk was present in the breasts. I was therefore driven to the conclusion that I had here an extra-uterine gestation developing extra-peritoneally. This diagnosis explained all the facts. The rupture at the second month had been into the right broad ligament, and the gestation had then developed between its layers until it attained the condition and relations given above. For a month I had been completely at fault, and only saw land after much puzzling. What misled me most was the negative result of my examination on the day subsequent to the rupture. During this time I had the valuable help and advice of Drs G. W. Balfour and C. E. Underhill.

Such being the diagnosis, the question of treatment had to be faced at once. The patient was in excellent health, and had an amount of energy and pluck that made me feel certain she would stand operative treatment well.

There was no doubt in my mind that delay was dangerous. Hæmorrhage was going on in the sac, as it had increased in size latterly very rapidly, and it might rupture soon. Even if that did not happen there was the risk of the death of the fœtus, and its discharge by rectum or bladder. I accordingly advised operation strongly, and it was agreed to.

I must now state what I believed to be the relations of the organs. The uterus was retroverted and to the left. The gestation was developing partly in the broad ligament and pelvic connective

tissue, and lay mesially behind the bladder. The fundus of the sac was free from placenta; this was of importance, as it gave me access without risk of hæmorrhage so far as the incision was concerned. What I thought I might do was to incise the abdomen, ascertain the relations of the sac; if extra-peritoneal I would cut into it, remove fœtus and placenta, and plug with iodoform gauze. If found pediculated, which I did not anticipate, I would ligature and remove entire if possible.

Accordingly on 30th March I operated as follows, with the assistance of Drs J. C. Webster, Gulland, and Lawson Dick. I made a mesial incision in the abdominal wall ending 2 inches above the pubes and about 4 inches in length. When the abdomen was opened I came on the top of the sac, covered with peritoneum and with the abdominal reflexion high (*v.* Fig. 1). I incised the peritoneum over the sac, stripped it to the sides, and thus exposed the upper connective tissue environment of the gestation,—*i.e.*, the top of the sac. I had thus opened into the abdominal cavity at the upper part of the incision, and also exposed the extra-peritoneal gestation. I next tapped the sac with an aspiratory needle, but got neither fluid nor blood. I therefore laid the sac open, cutting through a friable pigmented half-inch thick wall, and found blood-clot occupying a sac about the size of a large orange, placenta on the anterior wall and on fœtus, so far as I could make out. I cleared out the clots and separated the placenta, hoping to feel the fœtus then. Bleeding, however, was somewhat profuse, and so, after separating an apparently perfectly fresh piece of placenta about the size of the palm of my hand, I had to tampon the sac with gauze, close off the peritoneal cavity, and stitch the gestation sac opening to the abdominal wound. This latter stitching was really unnecessary.

The patient was in no way disturbed by all this, but I myself had some puzzling points to settle. In the first place, the sac was not so large and did not dip so deeply as I knew it must; then, secondly, where was the fœtus? The placenta was fresh and normal in appearance. Had I believed that the placenta could grow after the early fœtus had died all would have been clear; but this was, in my opinion, an untenable theory.

On the sixth day after (4th April) I removed the gauze in part, and on 6th April I removed it all, and then felt at the bottom an opening about the size of a crown piece, with the membranes and liquor amnii bulging. I ruptured them and came on the head of the fœtus. Pushing a pair of ovariotomy forceps through it, I then extracted a fresh 4½ months' fœtus, and found a lower cavity with placenta on the anterior wall.

I washed out the cavity, plugged it with gauze, and next day, on removing the plug, cleared out the rest of the placenta, the main piece being the size of the palm. I could then explore the sac digitally, and found it to be hour-glass shaped, the cavities being

upper and lower, with a circular opening between. The fœtus and membranes lay in the lower, and the placenta lined the anterior wall of both compartments. The deepest part of the sac touched the sacrum. The gestation had thus begun in the Fallopian tube, developed in the broad ligament, lifting up the anterior lumina mainly, and burrowing more deeply towards the sacrum. The placenta was in a favourable position, and had not been displaced much by the growing fœtus.

The after-progress of the case was slow but good. Drainage was kept up for a month, and irrigation freely used. In this way placental débris was washed out, and occasionally small pieces of placenta. On one or two occasions prior to the separation of a small piece of placenta the patient had a slight rigor, but this passed off whenever the sac was washed out. I should mention that in the second week there was some phlegmasia of the left leg.

The patient was completely well in about seven weeks after operation. It was remarkable how the sac slowly contracted and ultimately completely closed. As the contraction went on the vertical position of the tube slowly changed into a right-sided and oblique one, indicating how in natural healing the original position of the organs is resumed.

In this case both fœtus and placenta developed extra-peritoneally. In all cases of extra-uterine gestation the site of the placenta determines the nature of the gestation. The fœtus may become intra-peritoneal after being tubal or extra-peritoneal, but as a rule, which as yet knows no exception, the placenta, while arising in the tube and developing in the connective tissue of the pelvis, does not become intra-peritoneal in the sense of ever grafting itself on the free surface of the peritoneum.

I wish to emphasize, in conclusion, my belief that the treatment of extra-uterine gestation in such cases must be operative, and that the operation should be undertaken as soon as possible. In early non-pediculated cases such as this the fear of hæmorrhage from the necessary separation of the placenta is irrational. One can separate and plug the sac with gauze, and if entire separation is impossible at first, it can be completed in a few days afterwards. The opening into the sac should be left large, and it will be found that drainage goes on perfectly by means of the gauze until a glass tube can be substituted.

The following is Dr Gulland's report of the structure of the placenta:—

"I received from Dr Hart two pieces of the placenta of this case,—one which was removed at the time of the operation, the other removed seven days afterwards. They were both fixed in saturated sublimate solution immediately after removal, and pieces of them were hardened, cut in paraffin, and mounted in the usual way.

"The piece of placenta removed at the operation was perfectly

normal, as far as the fœtal structures were concerned (see Fig. 1). The villi were exactly like those of a normal 4½ months' placenta which is in my possession, both as to their arrangement and their microscopical structure. They were covered by a single layer of well-preserved cubical epithelium; the connective tissue core of the villi consisted of retiform tissue—connective tissue corpuscles lying on fine fibrils; and the vessels in the villi were filled with fœtal blood-corpuscles. The intervillous spaces were not so near the normal. Most of the maternal blood had of course drained out of them as the placenta was being removed piecemeal, but a certain amount was still to be seen in the sections. In addition, however, there were a few delicate threads of fibrin, which might have been recently formed, and here and there through the placenta were larger masses of fibrin, some almost as large as a pea. These were evidently the result of an old clotting of the maternal blood; the masses of fibrin sometimes surrounded a villus or two, and had compressed them, and the fibrin was riddled with leucocytes.

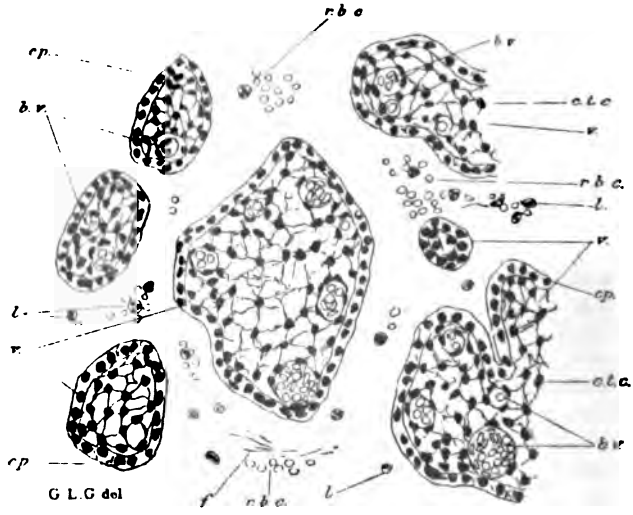


FIG. 1.—Part of the Placenta of an Extra-uterine Pregnancy (4½ months) removed at the operation. *v.*, Villus; *b.v.*, Bloodvessel (fœtal); *e.p.*, Epithelium covering the villus; *c.t.c.*, Connective tissue corpuscle; *l.*, Leucocyte; *r.b.c.*, Red blood-corpuscles (maternal) in intervillous spaces; *f.*, Fibrin. Obj. Zeiss DD, Oc. 4.

"The pieces of placenta removed during the after-treatment were very different in appearance. They were firm, dark-brown masses, evidently composed largely of blood-clot, and when sectioned it was found that the greater amount of the tissue consisted of this material. The villi had been crushed and distorted, and in many cases widely separated by the hæmorrhage. (Fig. 1 shows a part where the villi are unusually close together.) The epithelial

covering of the villi was not so distinct as in the former specimens, and both its nuclei and those of the connective tissue of the villi were markedly degenerated. The fibrils of the connective tissue, instead of the delicate network which they normally present, were in a state of hyaline degeneration, and greatly swollen; the blood-vessels could not be distinguished. The intervillous spaces were filled with dense masses of fibrin, in the meshes of which the outlines of degenerated red blood-corpuscles could be made out; there were a fair number of leucocytes also to be seen.

"These specimens are instructive, as showing the perfectly normal way in which the villi develop in extra-uterine gestation, and also the way in which they are altered by the death or removal of the fœtus, and by hæmorrhage."

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*The President* said there certainly were cases where there was no good reason to doubt that a tubal gestation sac had burst at about the second month, and the patient had recovered. There was room, therefore, sometimes for expectant treatment; but he agreed with Dr Hart in thinking that in cases where there had been indications of hæmorrhage, and still the sac continued to grow, the best chance of safety for the patient lay in operative treatment.

*Dr Barbour* congratulated Dr Hart on his successful case. It showed also the difficulty of diagnosing cases of early extra-uterine gestation even on careful examination under chloroform.

*Dr Kynoch*, Dundee, said he had listened with much pleasure to Dr Hart's paper. He should like to ask Dr Hart if he would advocate operative interference in cases of extra-uterine extra-peritoneal gestation at an earlier stage of development than the one he had described? Last year he saw such a case. The woman, aged 22, had been married three years, and had never been pregnant. Menstruation had always been regular, but she had missed the last two periods. When he saw her she complained of agonizing pain in the right iliac region, which she stated had come on when lifting a pail of water. She had a similar attack of pain on same side, but much less severe, a week previously (which, she stated, came on immediately after coitus). On examination he found both breasts contained milk. There was a slight hæmorrhagic vaginal discharge, and a soft tumour bulging into the vagina on the right side, and pushing the uterus to the left. There was a distinct swelling, dull on percussion, extending about 2½ inches upwards above Poupart's ligament on the right side. Believing it to be a case of extra-uterine gestation (about ten weeks) which had ruptured into the folds of the broad ligament, and as the patient's condition did not indicate operative interference, she was ordered an opiate and kept quiet in bed. Five days afterwards she had another severe attack of pain on the same side, and was now distinctly collapsed-looking. Fearing secondary

intra-peritoneal rupture, and before deciding to operate, he asked Dr Smart of Liverpool (who was north on holiday) to see the case with him. By this time, however, the patient had again so reacted that they decided to postpone operative interference. The expectant plan of treatment was continued, and beyond some bladder and rectal trouble the patient continued to improve, and in four weeks was attending to her household duties. Five months afterwards no trace of tumour; she was perfectly well, and had menstruated every month. (The difficulty was to decide *at the time* the cause of the collapse with the second attack of pain, whether merely further rupture between the folds of the broad ligament, or secondary intra-peritoneal rupture.)

*Dr James Ritchie* said that he supposed each case must be treated on its own merits; that every case of extra-uterine gestation which was continuing to develop was on the brink of serious danger, but that those cases which ceased to grow might recover without interference. Many years ago he had a patient about whose pregnancy there could be no doubt, because not only of the arrest of the menses, but because of the severity of morning sickness and other symptoms, which always previously had made the patient aware of pregnancy. Between the second and third month this patient was seized with sudden severe pain in the lower part of abdomen at right side. She was collapsed, and on examination there was a tumour at the right side of uterus. Extra-uterine gestation with rupture into right broad ligament was diagnosed. After a period of great anxiety the symptoms began to subside, the swelling decreased very slowly, and after some months no trace could be discovered. The patient made a complete recovery, and has remained well since.

*Dr Hart* replied.

VI. *The President* communicated the following paper on PROTRACTED GESTATION, by *Dr C. Paget Blake*:—

A. R. has always been very regular, both before and since marriage. She is now 25, and has been married nearly two years, during which time she has had two miscarriages, each at the end of the third month. She ought to have menstruated on October 20th, as the catamenia appeared previously on September 22nd, lasting then the usual time, and it was during their continuance that the husband left home on business matters for (as he had intended) six weeks. He was able, however, to return unexpectedly by a night train on October 15th.

The expected "period" (viz., October 20th) passed by, and she concluded that she was again *enceinte*, and she very shortly had all the ordinary symptoms of morning sickness, etc. I advised her to be unusually quiet, and to take as much rest as possible in the recumbent posture during the third and fourth months, to avoid the bad habit of aborting which she was likely to get into at that

special time. She followed my advice, and all went on well, so that I calculated she ought to have been confined on July 22nd, which would have been 280 days exactly from the early morning of October 16th, reckoning it, therefore, as one day.

Now comes one of the remarkable circumstances of this unusually remarkable case. At this very date there was an abundant secretion of milk, which ran away so freely that both breasts had to be most carefully protected day and night.

She continued to increase in size till August 3rd, when labour apparently commenced. She had strong regular pains, and everything betokened a speedy delivery. But this proved a false alarm, though the pains lasted, off and on, for three days, when they gradually subsided, and on August 6th they ceased entirely. Here, again, is a remarkable event in this peculiar case. She continued to get about and to increase in size until September 5th, when the child, an unusually large one, was born, after a perfectly normal labour, very early in the morning, about 2 A.M.

This gives 323 days; much the longest period, I think, on record. Dr Montgomery relates a case of 291 days well vouched for; but, as far as I can ascertain, this case is without a parallel.

Another remarkable feature about this is, the lady was a triplet, the eldest of three girls,—the second being still alive unmarried; the third, equally large and well formed as the other two, died shortly after birth.

VII. *Dr J. C. Webster* communicated the following NOTES OF A CASE OF EXTRA-UTERINE GESTATION, by *Dr Fred. Mann*:—

Mrs W., æt. 36 years, married twelve years ago, residing in Ashton-under-Lyne; v.-para, including this last pregnancy; youngest four years old; no miscarriages. Patient considers herself a healthy person as far as her sexual history is concerned. First seen by me on August 7th, 1892, on which day she had a great deal of pain in the abdomen, with severe vomiting. On inspecting the abdomen there was a swelling on the right side in the iliac region. Several possibilities occurred to my mind, the predominant ones being typhlitis or obstruction. The vomiting and pain were relieved by an effervescing draught of hydrocyanic acid and a morphia suppository. The next day she stated that the tumour had been there for about a couple of months, that it was growing rapidly bigger, that she had had pain several times on that side, that she had missed four periods, and that the date of the last menstruation was about the beginning of April 1892. She also stated that about the middle of June 1892 she had what she calls a "fainting fit." She did not think it necessary to send for a doctor, as she had suffered in a similar manner before—meaning faints—though this time she had to remain in bed a couple of days, after which she went about her household duties as usual. On examining her P. V. I found a tense fluctuating tumour on the right side, which

was painful on pressure, and apparently connected with the uterus The uterus was pushed over to the left side, somewhat enlarged, and erect. The cervix was neither hard nor soft like that of pregnancy, though pulsations could be felt in the vagina. I came to the conclusion it was an ectopic gestation. On the 9th she had labour-like pains, and showed me a "clot" which she had passed. On examining, it was the decidua; thus making the diagnosis doubly sure that here we had an ectopic gestation of about four months' duration. Having obtained her consent to operate, I did so the next day, the 10th August, with the assistance of Mr Aspinal and the district nurse. I chose the vaginal operation.

Chloroform being administered and the patient put in the lithotomy position by means of a Clover's crutch, I made an incision about an inch and a half long, laterally, into the vaginal wall. The bleeding was brisk, but easily arrested by torsion of all the vessels. No ligatures were used at all. Separating the cellular tissue I came upon what I took to be peritoneum, but it turned out to be the sac of the fœtus. Opening into this there was a rush of a dirty substance, prune juice in colour, along with fœtal bones. I passed my index finger into the sac, separated and removed the placenta. The reason of my removing the placenta was that after I had separated a small portion of it little or no bleeding occurred.

The cavity was washed out with a one per cent. solution of carbolic. I also ascertained that my operation had been entirely extra-peritoneal, not being able to get my finger into the peritoneal cavity. The cavity was packed with iodoform gauze for forty-eight hours, after which I administered a two per cent. carbolic douche every day, and passed my finger daily into the cavity to keep the vaginal mucous membrane from healing. The recovery was uninterrupted; the temperature never above normal. The cavity was completely closed in four weeks' time. The placenta, fœtal structures, and decidua were sent to Dr Webster for examination.

I should also state that the patient is again pregnant for the sixth time, the pregnancy being of about three months' duration.

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MEETING VIII.—JUNE 29, 1893.

Professor A. R. SIMPSON, *President, in the Chair.*

## THE ETIOLOGY OF ECTOPIC GESTATION.

By J. C. WEBSTER, M.D., F.R.C.P.E., Assistant to the Professor of Midwifery and Diseases of Women in the University of Edinburgh.

UNTIL recently the occurrence of Tubal Gestation has been attributed to the following conditions:—

1. *Those mechanically interfering with the passage of the ovum to*

*the uterus,—e.g.*, peritonitic bands constricting the Fallopian tube; polypi in the tube-lumen; tumours of its wall; tumours of surrounding parts pressing upon it; abnormal foldings of its wall; diverticula from the lumen in the wall.

2. *Those interfering with the peristaltic action of the tube,—e.g.*, adhesions between the tube and neighbouring parts; thickening of its walls by inflammation.

3. *Those destroying the action of the cilia of the lining cells of the mucosa,—e.g.*, endosalpingitis.

A careful analysis of these various conditions, hitherto described as the *causes* of tubal pregnancy, leads to the conclusion that the views current in regard to the subject are hazy and indefinite, their acceptance involving numerous contradictions as well as certain assumptions which are based entirely upon speculation, and in some instances not in accordance with facts. One of these assumptions is to the effect that in normal pregnancy the ovum becomes fertilized in the Fallopian tube; another that this always takes place in the uterus. A very widely-held view is that a fertilized ovum will grow in a tube with a *healthy normal mucosa* if it merely be prevented by some mechanical obstruction from reaching the uterine cavity; another assumption of more recent origin is that this cannot take place, but that development will only occur when the epithelium of the mucosa has been destroyed by inflammation.

That the above-tabulated conditions have been founded upon observations is undoubtedly true. To associate them in some way with the occurrence of the tubal pregnancy is natural; *but to establish them as the ultimate or essential factors in its causation is anything but logical.*

It is my endeavour in this paper to analyze carefully the relationship which these conditions bear to ectopic gestation, and to endeavour to allot to them their true proportional values as factors in its causation. In addition, I desire to bring forward some new observations, in the hope of removing many of the difficulties connected with the subject, and of establishing a more scientific basis for its future investigation.

It is necessary, in the first place, to consider one question which has an important bearing on the subject, viz., where the spermatozoa fertilize the ovum. It is generally believed that their meeting-place is normally the Fallopian tube. Lawson Tait and a few others believe that it is the uterine cavity; they hold that the ciliary action of the epithelium of the tubal mucosa prevents normally the spermatozoa from passing into the tubes. Without referring to the lower mammals, regarding which but scanty observations have been made, facts derived from the study of extra-uterine human pregnancy furnish evidence in favour of the view that spermatozoa can make their way from the uterine cavity into the tube-lumen whose lining epithelium may be healthy. It is not

uncommon to find an early tubal pregnancy in the outer end of tube whose inner end is perfectly normal. Such cases have been examined by Bland Sutton, Martin, myself, and others. This being so, it is difficult to know why fertilization may not take place in any number of cases, where the parts are entirely healthy. That it may also take place within the uterine cavity cannot, of course, be denied. The truth is probably that the spermatozoa are capable of working their way into both uterus and tubes, fertilizing the ovum wherever they chance to meet it.

Another important question to be considered is the following: *Is there any ground for supposing that a fertilized ovum can develop in the normal mucosa of the Fallopian tube?* That such a thing is possible has long been believed, especially by those who have insisted on the importance of mechanical obstruction as a cause of tubal gestation.

If the genital tract be studied phylogenetically, it is found that in the lowest animals there is no marked distinction between oviduct and uterus, that in higher forms each lateral tube becomes differentiated into an upper oviduct portion and a lower uterine portion, and that in the very highest forms the lower portions blend into a single uterus. In these highest mammals only the uterus is able normally to furnish the place of development for the ovum; the upper ends of the original lateral tubes, *i.e.*, the oviducts or Fallopian tubes, though remaining in continuity with the uterus, retain only the power of carrying the ovum from the ovary to the uterus. The tubal mucosa and that of the uterus (*corpus uteri*) behave differently in the reproductive process: the former is passive, the latter active; the one undergoes no important change, the other reacts markedly to the genetic influence, becoming transformed into the decidual tissue, which is, it must be believed, essential to the attachment and development of the young ovum.

The differentiation is as well marked as that between the lining membranes of the œsophagus and stomach. There is no more authority for supposing that the normal tube can perform the function of the uterus than for believing that the œsophagus can perform that of the stomach. In each of these cases the evolution of structural differences has been accompanied by marked functional differentiation.

No doubt the resemblance between the epithelial cells of the uterine and tubal mucous membranes and their direct continuity have helped to establish the assumption that the ovum can develop in relation to one set as well as in relation to the other. Such an assumption is, of course, entirely unwarranted, because structural similarities do not necessarily imply physiological harmonies or identical reaction-tendencies.

Moreover, all recent work—*e.g.*, that of Minot,[1] Hart and Gulland,[2]

[1] "Uterus and Embryo," *Journ. of Morphol.*, April 1889.
[2] *Lab. Reports*, R.C.P. Ed., vol. iv.

myself, and others—goes to show that the lining epithelium of the mucosa, both in tubal and uterine gestation, plays an entirely negative part as regards the development of the ovum.

Next, what is to be said regarding the belief that the ovum can develop in the tube only when the lining epithelium has been destroyed by inflammation?

It might be sufficient, in refutation of this statement, only to mention those cases of tubal pregnancy in which no inflammatory or other diseased condition is found in the mucosa.

Moreover, *in some of the cases* in which inflammation is found, there can be no doubt that it follows upon the disturbances in the tube attendant upon the development of the gestation.

This has been strongly urged of late by Martin,[1] whose recent observations have led him to give up his older views regarding the part played by endosalpingitis in causing tubal pregnancy.

One might also justly state, that whereas inflammation in the endometrium is not favourable to the development of uterine gestation, so inflammation in the tubal mucosa is *unfavourable to the development of a tubal pregnancy.*

I wish, however, to consider this statement as part of a more comprehensive idea which has been strongly urged of late by Bland Sutton,[2] Berry Hart, and Lawson Tait,[3] viz., *that the human ovum can graft itself only on a connective tissue from which the covering epithelium has been removed.* Mr Tait holds especially that in normal uterine pregnancy this supposed necessary raw surface is prepared by menstruation, as was first suggested by Pflüger, and in tubal pregnancy by endosalpingitis. In referring to the uterus he uses the words "a *healthy mucous surface freshly denuded,*" and in reference to the tube he says that "a desquamative salpingitis could put the mucous lining of the tube into a condition exactly similar to that of the uterus." This statement is open to the criticism, that while a resemblance might possibly be pointed out between an endometrium partially denuded and an early acutely inflamed mucosa, there is not a very close resemblance in the case of a chronic inflammation surface.

That these authors are right in insisting upon the passive and unimportant part played by the epithelium of the mucosa both in the case of tubal and uterine pregnancy cannot be too strongly urged. All the latest embryological investigations give support to the view that the attachment and early development of the ovum take place entirely in relation to the sub-epithelial connective tissue of the mucosa. I take exception, however, to the explanation of the early establishment of this relationship, on account of the great difficulties in the way of believing that menstruation is the process essential to the removal of the epithelium and the consequent

[1] "Ueber Ektopische Schwangerschaft," *Berlin. Klin. Wochenschr.*, 1893, No. 22.

[2] *Surgical Diseases of the Ovaries and Fallopian Tubes*, London, 1891.

[3] *Diseases of Women, etc.*, Leicester, vol. i. 1889.

laying bare of the connective tissue. These difficulties are as follows:—

1. Pregnancy may occur in a girl before the onset of menstruation,—at a time, therefore, when the mucosa cannot be denuded by that process.

2. It may occur late during the period of lactation, when there is no menstruation, and after the mucosa has been completely renewed.

3. It may take place at the menopause during a period of amenorrhœa.

4. It may occur in periods of amenorrhœa associated with diseased conditions, *e.g.*, anæmia, phthisis.

5. Clinical experience of cases of pregnancy following a single coitus shows that the ovum may begin to develop at any time—not necessarily immediately after menstruation. (*Evidence in regard to this point, however, is of doubtful significance, owing to the uncertainty in our knowledge as to how long the spermatozoa may remain in the genital tract, and how long the ovum may take in some cases to reach the uterus.*)

6. In the great majority of the mammals menstruation does not take place, and in many of them we know that the ovum develops in relation to the connective tissue of the mucosa.

Indeed, it is not at all necessary to look to menstruation as the process by which the epithelium is removed. The absorptive power of the trophoblast, or outer layers of the fœtal epiblast, is a most important factor in bringing about its disappearance. My recent studies in early tubal pregnancy lead me to believe that this is also accomplished, partly, by another agency, viz., the rapid changes in the connective tissue of the mucosa leading to the formation of the *decidua vera*, and causing the covering epithelium to be stretched and broken up.

(Regarding the exact nature of menstruation we are still in the dark. It seems probable that it is not the same as that in the lower animals; it is not dependent upon ovulation, just as the latter is not dependent upon menstruation; it is not necessary to conception; it probably only occurs in relation to the erect posture; in the highest apes it occurs in captivity only to a slight extent and not in all cases, while in the wild state it does not appear to take place; among mankind it becomes a more marked characteristic of woman as civilisation advances.)

Having thus considered these important questions, I wish now to bring forward certain facts which seem to me to suggest a sound basis for an explanation of the occurrence of extra-uterine gestations.

I have referred to the gradual evolution of the Fallopian tube and uterus, and to the marked differences in function which exist between them in the human female.

Hitherto it has been believed that in every case of uterine gestation the decidual changes in the mucosa, which are apparently

essential to the early ovum, and which result from some sympathetic reaction following its fertilization, take place only in the body of the uterus, the tubal mucosa remaining unchanged. This view is based upon the microscopic examination of the tubes in normal pregnancy. It is also held that in cases of single tubal pregnancy, while the uterine mucosa undergoes marked decidual change, the non-pregnant tube of the other side remains practically unaltered. Recent observations which I have made prove that the latter statement is not accurate, and throw some doubt upon the value of observations made upon the tubes in normal pregnancy. (To study these points thoroughly it is necessary to examine serial sections of *every part of the tube*, not of one part only, as is usually done.)

The observations to which I refer are as follows:—In examining a large number of tubal gestations *I have found marked differences in the extent to which a decidua vera is formed.* In some cases only a small part of the mucosa undergoes this change, in others a large part. In no case is there an absence of decidual formation. In those instances in which I obtained the non-pregnant tube (only in *post-mortem cases*) I always examined a small part of it. In one case, however, in which the tube was enlarged in its ampullary portion, I made a thorough examination of every part of it, and found, to my great surprise, that an irregular ring-like portion of the ampullary mucosa in its entire circumference differed markedly from the rest of the mucosa, as well as from the mucosa of every other tube that I had examined. Later, I shall publish minute descriptions and drawings of the conditions found. For the present a few words will suffice. The differences consisted in, in the first place, a *simpler arrangement of the folds* than is found in the normal *ampulla;* they were much fewer in number, shorter, and only slightly branched. In the normal ampulla the delicate branching mucous fringes, as seen on transverse section, practically fill the tube-lumen. In this case they formed thick projections,—club-shaped, finger-shaped, wart-shaped, etc., extending inwards only for a short distance. In the second place this part of the ampullary mucosa *showed marked decidual formation*, the large cells resembling exactly those found in the uterus in normal pregnancy.

The tube of the opposite side (the left one) was about two months pregnant, the uterine mucosa showed marked decidual changes, the left ovary contained a *corpus luteum*, the right one (that on the non-pregnant side) containing none. This case is most instructive. It emphasizes most strongly that decidual formation is due to the influence of the *fertilized ovum* in the genital tract; that this influence can act at a distance, direct contact of the ovum not being necessary; that while in tubal pregnancy the uterine mucosa always undergoes this change, the *tube of the other side may also sometimes be similarly affected.*

All these facts, it seems to me, taken along with those relating

to the evolution of the uterus and Fallopian tube, suggest a hypothesis which lends itself to a satisfactory explanation of all the well-recognised forms of ectopic gestation.

Among those animals (some non-mammalians) possessing a genital tract, the least specialized condition is that in which there is no distinction between oviduct and uterus, in which the tract is bilateral, and in which the ova may develop practically along its whole extent. In higher forms, certain mammalians, differentiation has occurred in the Müllerian ducts, as I have already described; in many of these—*e.g.*, cat—with bicornuate uterus several ova develop in the whole extent of each horn, the mucosa undergoing the necessary decidual changes. In other forms with bicornuate uterus—*e.g.*, cow—only one ovum, as a rule, develops in one of the horns, *but the mucosa of both horns undergoes, as a result of the genetic influence, marked decidual changes;* these changes are in the case of the non-pregnant horn, as far as we know, entirely unnecessary to the development of the ovum in the other horn. (It is well known that pregnancy may go on perfectly well in cases where one horn is absent.) When we come now to the human female, in which the single uterus exists, we find that the decidual changes induced by pregnancy, in the great majority of cases take place in the uterine mucosa, where the ovum normally grows.

However, *in some cases*, as I have shown, the tubal mucosa can, in great or small extent, respond to the genetic influence, as well as that of the uterus, in all probability because of some developmental fault whereby there is reversion either of structure or reaction tendency in the tubal mucosa to an earlier type in mammalian evolution,—I mean that in which a larger portion of the Müllerian ducts showed decidual reaction.

Because of these occasional changes in the Fallopian tube, conditions are brought about capable of establishing with a fertilized ovum that relationship which is essential to its development. If, then, the deduction be established that it is possible for a fertilized ovum to grow only in relation to that part of the genital tract, whether tube or uterus, in which the genetic reaction occurs, the explanation is evident why, in the human female, a pregnancy may occur *sometimes* in a part of the genital tract outside the uterine cavity.

When the above-mentioned conditions exist in any case, several factors determine whether a fertilized ovum shall develop in the tube or uterus. The place of fertilization of the ovum is important. Ectopic gestation probably only occurs when this takes place in the tube above the part of the mucosa showing the decidual reaction. When it occurs in the uterus the gestation will only take place there. Fertilization may occur in that tube which does not show the decidual reaction; it may occur in the tube showing the reaction, but at a point lower down. It is possible, however, that it may occur above the reacting part, and yet be carried down past

it to the uterine cavity, if no conditions exist which can prevent this taking place. And in this connexion we are able to understand the part played by such conditions as inflammation, tumours, etc., in the tube or outside it, which lead to some interference with the free continuity of the tube-lumen. Given the fertilization of the ovum high in the tube, the obstruction to its free passage to the uterus after this takes place, along with *the occurrence of the necessary decidual reaction in the mucosa* with which the ovum comes in contact, and we have a satisfactory explanation of the pregnancy which develops.

The adoption of these views, which imply that the ovum can only begin its development on a tissue capable of a special genetic reaction, and therefore only in some portion of the passages derived from the original Müllerian ducts, makes it *difficult to believe in the possibility of the occurrence of a Primary Abdominal pregnancy.*

Though of late, owing to the writings of Bland Sutton, Lawson Tait, and Berry Hart, belief in the existence of such a gestation has been widely discredited, no well-founded reason has been raised to show why it should not take place. Indeed, considering the factor which these authors had believed to be of chief importance in the development of tubal pregnancy, viz., inflammation destroying the mucosal epithelium, it does not appear, according to that view, why a fertilized ovum might not attach itself and grow on a part of the wall of the abdominal cavity which had lost its superficial covering of cells through the same pathological process. According, however, to the view which I have advanced, the primary intra-peritoneal development is improbable, because the peritoneal tissues cannot, as far as is known, undergo the changes required for the establishment of the necessary relationship with the young ovum.

As regards the ovary there is more difficulty. We have no reason to believe that the Graafian follicles can respond to the genetic influence, and there is no proof that a pregnancy has ever started in them.

Supposed cases of Ovarian pregnancy require to be studied carefully, and in every instance must be distinguished from the following conditions which may be mistaken for it,—viz., pregnancy in the outer end of the tube which has become intimately connected with the ovary; pregnancy in an accessory tube end which has become attached to it; pregnancy in the ovarian fimbria, which may be hollow sometimes, representing the extreme outer end of the tube; pregnancy in the tube which has extended into the ovarian sac of peritoneum, which occasionally occurs in women. *Primary* development of the ovum in the ovarian sac is as improbable as in relation to any other part of the peritoneal cavity.

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Drs Berry Hart, Lovell Gulland, J. W. Ballantyne, Wm. Fordyce, and the President took part in the discussion, and Dr Webster replied.

MEETING IX.—JULY 12, 1893.

Professor A. R. SIMPSON, *President, in the Chair.*

I. *Dr. J. W. Ballantyne* exhibited frozen sections and drawings of an ANENCEPHALIC FŒTUS WITH SPINA BIFIDA IN THE CERVICAL REGION. This was the fourth specimen of anencephalus which he had examined by the sectional method, and it had been kindly given him for the purpose by Dr James Smith. The fœtus was born on October 3rd, 1892. The mother was a vii.-para; four of her children were alive, two had died from scarlet fever, and that fever had affected members of her family during her seventh, the present, pregnancy. Her abdomen was so greatly distended that Dr Smith expected a plural gestation,—twins, and possibly triplets. The membranes presented as a bag, and when they had been ruptured artificially twenty-seven pints of liquor amnii escaped. There was therefore enormous hydramnios, which accounted for the large size of the abdomen. The presentation was a footling, and the cord was short and twisted once round the thigh. The fœtus was alive during labour, for the limbs moved, but it was still-born. Pregnancy was nearly at the full time. The placenta was small, but was normal in appearance. The fœtus, a female, had all the external characters of typical anencephaly. It measured 39 cms. in length from vertex to heel, whilst from vertex to symphysis pubis was 23 cms. Of course, from the absence of the cranial vault, the so-called vertex was really the exposed basis cranii. The circumference round the head was 22 cms.; round the shoulders, 34 cms.; round the thorax, 27·5 cms.; and round the abdomen, 26 cms. The external ears were deformed, and projected outwards from the head. The eyes were staring and directed upwards, and there was an indication of a neck anteriorly. A mesial vertical and a left lateral vertical section were made. All the vertebræ were present; but the cervical members of the series were directed backwards beneath the basis cranii, and had their spinal canal open. The basis cranii looked backwards as well as upwards, whilst the posterior part of it, the basi-occiput, ran vertically downwards, and seemed on section to be the body of a supernumerary vertebra. The spinal cord was present in the dorsal and lumbar regions. There was blood in the mouth and œsophagus, and in the pericardial sac. There was no trace of a cranial vault. The parts in the region of the neck showed the usual displacement.

*Dr J. W. Ballantyne* made a FURTHER STATEMENT WITH REGARD TO THE INFANT WITH A BIFID HAND which he had shown to the Society at its meeting in November 1892. It would be remembered that he had then described the elbow-joint as larger than that of the opposite side, and had expressed his opinion that there

Wernher's Specimen of Paracephalus Monopus.

Wm CATHIE. LITH

was some anomaly in the lower end of the humerus, and also in the radius. He had recently had a letter from Professor Thomas Dwight, along with a reprint of his paper on "Fusion of Hands" (*Memoirs of the Boston Society of Natural History*, vol. iv. No. 10), and in this paper a very similar case was described and an account of the dissection given. In it there was no radius, but two ulnæ. The ulnæ articulated by means of two olecranons with the lower end of the humerus, which was also double, consisting of an internal condyle on each side and two fused external condyles in the middle line. Dr Dwight had written to say that he believed a similar state of things would be found to exist is his (Dr Ballantyne's) case, and from a re-examination of the patient he was convinced that Dr Dwight was right. It was, therefore, truly a case of double hand and forearm, with absence of the radiuses and their digits.

II. *Dr Brewis* showed the FŒTUS and PLACENTA of an extra-uterine gestation, removed by abdominal section.

## III. STUDIES IN FŒTAL PATHOLOGY AND TERATOLOGY.

(SECOND SERIES.)

### IV. ALLANTOIDO-ANGIOPAGOUS TWINS—PARACEPHALUS MONOPUS, APUS, AND PSEUDO-ACORMUS.

By J. W. BALLANTYNE, M.D., F.R.C.P.E., F.R.S.E.

IN order to complete the study of paracephalic fœtuses it is necessary to consider the three remaining groups, *paracephalus monopus*, *p. apus*, and *p. pseudo-acormus*. I have collected together in one division all paracephalic monsters with one lower extremity, for it seemed to me erroneous to place them, as does Taruffi, in the group *p. dipus* among the two-legged fœtuses. With this exception I have followed the arrangement advocated by the great Italian teratologist.

#### GROUP II.—PARACEPHALUS MONOPUS.

Comparatively few one-legged paracephalians have been reported, and I have been able to find only seven such. In none of these was there a heart, so it is unnecessary in the present state of our knowledge to subdivide this group into cardiacus and acardiacus; it will be time enough to do so when a heart-bearing specimen has been recorded.

*Historical Notes.*—Otto, in 1841, described what seems to be the first certain example of paracephalus monopus, and two years later Wernher described another (*vide* Plate) in his work on Congenital Hygromata. Meckel in 1850, and Schoenborn in 1863, also put

on record undoubted examples of this monstrosity. Lusk, in 1873, described a specimen which I have no hesitation in placing in this group; but I do not feel so certain about the fœtus noted by Stuart Nairne in 1889.[1] The case narrated by Lebouq in 1877 seems to have been a true instance of paracephalus monopus.

*Synonyms.*—Since this group has not previously been differentiated, it cannot have any synonyms in the exact sense of the word. Most writers have been content to place its members in one or other of the already existing groups, and to give them the name of the group in which they were so placed. Förster, for example, put them with the acephali; Ahlfeld found a place for Otto's specimen among the acardiaci acephali, and one for Wernher's fœtus with the acardiaci ancipites. Otto himself used the phrase "monstrum humanum sireniforme." Lusk and Schoenborn named their specimens simply acardiac fœtuses, and Lebouq called the fœtus described by him a paracephalian acardiac. Nairne in the title to his paper speaks simply of a "monstrosity," but later he gives to it the lengthy designation "hemicephalic sinistral adigital monster." As has been already said, Taruffi places these one-legged paracephalians in the same group with the two-legged (paracephalus dipus).

## Clinical Details.

Clinical details concerning the seven recorded cases in this group are very scanty. In two instances (2 and 4) the mother was said to be healthy, and in No. 4 her age was given at from 27 to 28 years. She was a ii.-para in No. 4, and a "multipara" in No. 2. In No. 4 the mother had given birth to a normal infant some years previously, and had had no miscarriages. The pregnancy was always a plural one: twin in Nos. 1, 3, 4, 5, and 6; triplet in Nos. 2 and 7. Labour seems to have occurred at the full term in No. 7, at the seventh month in No. 4, at the fifth month in No. 1, and about the second month in No. 3. In No. 4 it is stated that the normal twin was born first. The other fœtus was described as normal in Nos. 3 and 4, whilst the other two were well formed in the triplet cases (Nos. 2 and 7). The fœtuses were males in Nos. 1 and 2; both were females in No. 4; and in the other cases the sex was not apparent in the monster, and not recorded in the normal fœtus. The normal twin in the two months' abortion sac (No. 3) measured 2½ inches in length; it was three times as large as the monster in No. 4.

## Morbid Anatomy.

### I. Of the Fœtus.

*a. Dimensions, etc.*—The fœtus measured 10 inches in length in Nos. 2 and 7; 6 inches in No. 1; and 4½ inches in No. 4. It

[1] Dr Stuart Nairne has kindly sent me an unpublished sketch of the external appearances of his specimen, from the consideration of which it becomes certain that it was a paracephalus monopus.

weighed 11 oz. in No. 7. In form it was compared to a large beetroot in No. 6, and in No. 4 was said to have an irregular figure.

*b. State of the Subcutaneous Tissue.*—The integument was described as anasarcous in No. 1; the subcutaneous tissue was œdematous, and contained cysts, in No. 2; and in No. 7 the skin was tough, and the cellular tissue thick and coarse.

*c. State of the Head.*—In No. 1 the head was hydrocephalic; in No. 2 (*vide* Plate) it was pyramidal in form, and bore dropsical sacs; in No. 4 it formed a large elliptical tumour; it was a large pouch filled with fluid in No. 5; and in No. 7 it was more developed on one side than on the other, and carried hairs on the top. In No. 1 the cranial bones were small and soft, and the lower jaw rudimentary; in No. 5 the cranium was rudimentary; in No. 6 it was relatively well developed; and in No. 7 the bones were all imperfect, and those only of the left side were found. The cerebrum was full of fluid, but the cerebellum and medulla oblongata were normal, in No. 1; in No. 6 there was some brain-like substance in a state of putrefaction; and in No. 7 the cranium contained syrup-like matter. The eyes were indicated by the palpebral fissures in No. 1; there was no sign of the left, and a fissure indicated the right eye in No. 2; there was a cyclopic eye in No. 3; there were indications of the eyes in Nos. 4 and 6; and in No. 7 the left eye was rudimentary, and the right was indicated only by a depression. The external ears were absent in No. 1, they were deformed in Nos. 2 and 6, and the left was present, but small, in No. 7. There was a deformed nose in Nos. 1, 4, and 6; and in No. 2, whilst the right half of the nose was present, in the place of the left was a fissure opening into the mouth. The presence of a mouth was noted in Nos. 1, 2, 3, 4, and 7; the upper lip was cleft in Nos. 1 and 7; and there was double hare-lip in No. 4.

*d. State of Vertebral Column.*—No details concerning the spine were given in Nos. 2, 3, and 4. The vertebræ were said to be complete in No. 5, and were probably so in No. 6 also. In No. 1 there were five cervical, eleven dorsal, six lumbar, and no sacral or coccygeal. The spine was curved, and was no doubt incomplete, in No. 7.

*e. State of Upper Limbs.*—In Nos. 1 and 7 the upper limbs were absent; in Nos. 2, 3, and 6 the right arm was present, although in No. 3 it bore only three toes; the left arm was rudimentary and twisted back in No. 2, and it was concealed in the covering of the thorax in No. 3; in No. 4 the left arm was deformed, and the right was very rudimentary.

*f. State of Thorax and its Viscera.*—The ribs were present in Nos. 2, 5, and 7, but only on the left side in the last; there were eleven ribs and a divided sternum in No. 1; and there was no sternum in No. 5. The absence of the thoracic viscera was noted in Nos. 1, 2, 4, 5, 6, and 7, and the thorax was filled with serous

connective tissue in No. 2. The trachea was present in No. 7, and there was no distinct diaphragm in No. 2.

*g. State of Abdomen and its Viscera.*—Details concerning the abdomen were wanting in several cases. The liver and spleen were absent in Nos. 1, 2, and 5; the pancreas also was absent in Nos. 1 and 5, and the stomach in No. 1. Both suprarenal capsules were present in No. 5, but the right was absent in No. 1. In Nos. 2 and 5 both kidneys were present; in No. 1 the right was absent, and in No. 6 the left. The bladder was absent in No. 1, present in No. 5. One testicle was found in the abdomen in No. 2, and both in No. 1. Intestinal coils were noted in Nos. 1, 2, and 6; in No. 2 the curious fact of the presence of meconium (there was no liver) was observed.

*h. State of External Genitals and Anus.*—There was no trace of the external genitals in Nos. 1, 4, and 6; there was a penis with prepuce and an empty scrotum in No. 2; the anus was absent in Nos. 1, 2, and 4; and in No. 6 there was a common opening for the intestine and right ureter.

*i. State of the Lower Limbs.*—As is indicated by term *monopus*, all the fœtuses of this group possessed only one lower limb. The extremity that was present was the right in Nos. 2 and 6, and the left in Nos. 4 and 7. In Nos. 1, 3, and 5 it was not stated which leg existed. There were three digits in No. 3, two in No. 5, and none in No. 7.

*j. State of Muscular System.*—In No. 7 it was stated that the muscles were ill-defined, and no doubt they were imperfect in the other cases, although the fact is not recorded.

II. Of the Placenta and Cord.—Nothing was said of the placenta and cord in No. 1, and in No. 7 it was simply stated that the vessels of the cord were lost in the abdominal walls. In No. 2 (triplets) the umbilical cord of the monster contained only one artery (the right); in the body of the fœtus were two vessels, an artery and a vein, which were said to unite above to form one arch, whilst in the pelvis they formed by their union a second arch. In No. 3 (two months' abortion) there were the decidual membranes, one chorion, and two amnions; one amniotic sac was larger than the other, and contained a normal fœtus and cord, the other contained the acardiac monster, the cord of which was atrophic, and contained one artery and one vein; the cord of the former was inserted centrally, that of the latter at the margin, and their vessels anastomosed. In No. 4 the placenta was single and elliptical in form, the part belonging to the normal twin being larger than that of the acardiac; there was a common chorion and two amniotic sacs, the one containing the normal fœtus being the larger; there were two cords inserted at a distance of 8·5 cms. from each other; that of the monster, which was inserted at the margin, contained a vein and two arteries, but the right was filled with a thrombus;

and there was a communication between the two circulations. In No. 5 there was a single placenta and two umbilical cords, with a common insertion and an anastomosis between their vessels. In No. 6 the umbilical cord of the paracephalian contained a vein and one artery, the latter at its entrance into the abdomen divided into two branches,—one, the smaller, passing down to the single leg, the other passing upwards and turning towards the right arm.

### General Characters.

The only point in which these fœtuses differed from other acardiac paracephalians was the presence of but one lower limb; and it is interesting to note that in all the cases in which the fact was mentioned the umbilical cord contained only one artery, with the exception of No. 4, in which, however, one of the two arteries was plugged. It would seem also that the leg and umbilical artery present were both on the same side.

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### Literature.

1. Otto (A. G.).—*Monstrorum Sexcent. Descriptio,* Observ. 261, p. 154. Plate ix. fig. 1. 1841. Illustrated.
2. Wernher (A.). — *Die angeborenen Kysten-Hygrome,* p. 38. Plates iii. and iv. Giessen, 1843. Illustrated.
3. Meckel (H. von H.). — Müller's *Archiv,* p. 270. Plate vii. fig. 12. Berlin, 1850. Illustrated.
4. Schoenborn (C.).—*De monstris acardiacis,* Obs. 2, p. 50. Berlin, 1863.
5. Lusk (W. T.).—*American Journal of Obstetrics,* vol. vi. p. 629. 1873-74.
6. Lebouq (H.). — "Description anatomique d'un acardiaque humain, paracéphalien," *Annales de la Soc. de Méd. de Gand,* p. 37, 1877.
7. Nairne (J. Stuart).—"Dissection of a Monstrosity," *Edin. Med. Journ.,* vol. xxxiv. p. 813. 1889.

### Group III.—Paracephalus Apus.

The term *paracephalus apus* has been given by Taruffi[1] to such allantoido-angiopagous twins as have a trunk, the indications of a head, but no extremities. The number of specimens belonging to this group is still small. Taruffi in the second volume of his work enumerated four examples in the human species, but added a fifth in the appendix to his third volume; and I have discovered a sixth instance, that recorded by Lahs. The external appearances of these fœtuses are not very distinctive, and possibly some of the specimens described as mylacephalic and anidean may really have

[1] Taruffi (C.), *Storia della Teratologia,* vol. ii. p. 160, 1882.

been cases of limbless paracephalians, and *vice versa*. Further, they are neither sharply marked off from the one-legged variety on the one hand, nor from the pseudo-acormic group on the other, forming as they do an intermediate or transition type, and are on this account also difficult of recognition and classification. When the existence of the group becomes better known, it is probable that the number of recorded cases will be added to. I have arranged the specimens of paracephalus apus that have been collected together in two sub-groups, in one of which some traces of the heart were present (*cardiacus*), whilst in the other there was no indication of that organ (*acardiacus*).

*Historical Notes.*—The first recorded instance of a limbless paracephalic twin seems to have been that noted by Lieber in 1821 (3). As Taruffi has pointed out, the classification of this monster proved to be a difficult matter for Saint-Hilaire and Ahlfeld; with the result that the former placed it with the paracephali, although he had stated that the presence of the lower limbs was one of their distinctive characters, whilst the latter grouped it with the acormi, although it was possessed of a pelvis. Hempel in 1850 (4), and Barkow in 1854 (5), described the second and third authentic cases of this monstrosity, the former calling his specimen an acephalic fœtus, whilst the latter named his pseudo-amorphic. Thomson Lowne in 1872 (6) put on record the fourth example, to which the name of acardicus mylacephalus was given by Doran.[1] E. Müller (1) described another instance in 1881, and gave it the designation "acardiacus," although, as a matter of fact, traces of a heart were found in it. With regard to the classification of Müller's specimen, Taruffi seems to have had some difficulty, for he has placed it both among the limbless paracephalians and with the anidean amorphic fœtuses; but, from a full consideration of the dissectional appearances, I prefer to retain it here. Finally, Lahs (2) in 1883 recorded a sixth specimen (also a heart-bearing one), and entitled his communication "Die Beschreibung eines Acardiacus."

*Synonym.*—Taruffi regards the term "*hétéroïde*," introduced by Pictet[2] in 1851 to describe a monstrous calf, as synonymous with paracephalus apus; but he does not consider it as so descriptive as the latter, which he therefore prefers. Dareste,[3] however, has retained the expression "hétéroïde." Whilst admitting that the absence of the limbs is not always complete in fœtuses of this group, I adopt Taruffi's nomenclature, for the reason that Pictet's specimen, in addition to a head and an anidean-like mass for a trunk, possessed rudimentary caudal vertebræ, which are not found

[1] Doran (A.), *London Obstet. Soc. Trans.*, vol. xxxi. p. 18, 1889.

[2] Pictet, "Description d'un veau monstrueux formant un nouveau groupe (hétéroïde) dans la famille des monstres anidiens," *Mém. de la Soc. de Phys. et de l'Hist. nat. de Genève*, vol. xii. p. 335, 1851.

[3] Dareste (C.), *Production artificielle des Monstruosités*, p. 492, 1891.

in the specimens belonging to the human species. The term "hétéroïde" might possibly be retained for use in comparative teratology, whilst paracephalus apus is employed for this monstrosity in man. They are not exactly synonymous expressions.

## SUB-GROUP I.—PARACEPHALUS APUS CARDIACUS.

CLINICAL DETAILS.—In the two specimens of paracephalus apus in which some trace of a heart was found, the clinical details given were meagre in the extreme. In Müller's case (1) it was stated that the fœtus was sent in for examination without the placenta, and accompanied by the note that the mother was a multipara, and that the other twin was full time and normal. Lahs (2) says nothing at all about the confinement in his case, but from the title of his paper it may be inferred that the monster was a twin.

MORBID ANATOMY.—Since only two specimens of paracephalus apus cardiacus have been described, it will be more convenient to record the details of each separately than to group them together as has been done with the members of the larger groups.

*External Appearances in No.* 1.—E. Müller's specimen (No. 1) was a flattened, nearly circular, mass, having a maximum diameter of 11·5 cms., and showing above one flattened side, and in the narrower part of the ovoid a depression into which was inserted the umbilical cord (10 cms. in length). The author noted its resemblance to a kidney, the depression representing the hilum and the cord the ureter. The whole mass was covered with slightly wrinkled skin, possessing fine lanugo hairs; but just above the depression was a patch of skin provided with long, thick, brown hairs like those of the scalp. Below this area, and just above the so-called hilum, were several small verrucose excrescences, containing an atheromatous substance, and unprovided with hairs, among which were some small apertures leading into short canals. In the same region, which represented a rudimentary face, were two well-marked eyelids. There were no traces of the extremities.

*Dissectional Appearances.*—The skin showed few papillæ, very fine hairs with well-developed arrectores pilorum, sweat and sebaceous glands; and the connective tissue of the cutis was in an early stage of development. The subcutaneous tissue formed a thick layer which contained much fat, communicating spaces, and numerous peripheral nerves and vessels. The cranium was represented by a well-ossified closed capsule the size of a hazel nut, articulating with the upper end of the vertebral column. The coronal suture was seen marking off the frontal bone, but there were no fontanelles. There was scarcely any trace of the bones of the face. The brain was rudimentary, being represented by a small reddish-brown mass, which on microscopic examination showed nervous elements. Four pairs of cranial nerves were seen.

The spinal column was present; it was markedly curved, a consisted of three cervical, seven dorsal, two lumbar, and th sacral vertebræ. It contained a rudimentary spinal cord endi in a marked cauda equina. The sympathetic cords were prese There was no sternum, but seven ribs were found on each side, a there were two scapulæ, but no clavicles. There was a thora abdominal cavity, the diaphragm being absent. This comm cavity contained connective tissue; two vessels, an artery and vein, continuous with those in the umbilical cord; and two sm sacs. One of the sacs, which was as large as a pea, and lay in fro of the cervical vertebræ, represented the heart in a degenerat state, for it showed smooth muscular fibres in its walls, and contained blood. In its walls, but not opening into it, were a artery and a vein. The other sac, which was of the size of a gra stone, seemed, from the microscopical characters of its walls an of its contents, to belong to the upper part of the digestive trac No other viscera were noted. The umbilical artery, from the plac of entrance to the middle of the thorax, ran from above downward and having furnished two small branches to the upper half of th trunk, divided into ten arteries disposed radially. The umbilica vein scarcely penetrated the body; it divided into three branches which ultimately subdivided to pass to the separate parts. The muscular system was fairly well developed, especially in the region of the back, where the trapezius, serratus anticus and posticus, rhomboideus, etc., could be recognised; but signs of fatty degeneration were evident in many of their fibres.

*External Appearances in No.* 2.—Lah's specimen (No. 2) was a mummified reddish-brown fœtus, 8·5 cms. in length and 2·5 cms. in breadth. It was somewhat flattened antero-posteriorly, and had a thickness near its middle of 3·5 cms. The nose, mouth, and external ears were clearly recognisable. The head was distinctly marked off from the trunk posteriorly, but not in front or at the sides. There was no trace of the upper limbs, and the only indication of the lower was a small stump, 1 cm. long and 2 mms. thick, with a rudimentary foot (3 mms. in length) showing indications of toes, lying at the right side of the lower end of the trunk. Near this end also, and on the anterior surface, was inserted the unligatured stump of the umbilical cord, which was much twisted, and contained two large blackish-brown vessels, one of which measured 1 cm. in diameter and the other 6 mms.

*Dissectional Appearances.*—In the skin and subcutaneous tissue the parts could not be differentiated, but on the back of the trunk were several cavities about 1 cm. in diameter containing free reddish-brown fibrinous masses. There was very incomplete development of the cranium. There were no parietal or frontal bones, but a fully ossified squamous occiput, bent forward at a sharp angle, was present. The temporals were cartilaginous, and the two halves of the lower jaw were well developed and osseous,

but not united anteriorly. In the anterior of the cranium was some blackish material. The sternum was present, but showed a wide fissure; all the ribs were found, as were indications of the two clavicles. Only the right half of the pelvis was developed, and that only in part, and attached to it was the very rudimentary right lower limb. The thoraco-abdominal cavity contained connective tissue, a convolution of large vascular loops, and only one viscus, the rudimentary heart lying inside the fissured sternum. From the right anterior half of this organ arose a single short vessel (the truncus arteriosus), which soon divided into aorta and pulmonary artery. These united to form one trunk (aorta), which ended in the left umbilical artery, and showed just before its termination an indication of the right umbilical artery. Into the left heart cavity opened a vein which came from the neighbourhood of the left temporal bone, the left jugular vein. In the umbilical cord was a single vein, which in the body of the fœtus divided into two vessels (a smaller, the right; and a larger, the left umbilical vein), and received a small tributary, the omphalo-mesenteric, with its branch the mesenteric vein. At a point where both umbilical veins reunited, they were joined by a short right jugular vein, and they altogether opened into the left half of the rudimentary heart, having filled the thoraco-abdominal cavity with their coils. From the state of the vascular system, the author concluded that the fœtus had died between the fourth and fifth month, and had gradually been mummified; but the bloodvessels, remaining open and containing fluid blood, had become distended.

## Sub-Group II.—Paracephalus Apus Acardiacus.

Clinical Details.—The clinical history of the four specimens of paracephalus apus acardiacus which have been described was very imperfect. In No. 4 it was stated that the fœtus was one of twins, but no other details were forthcoming, and there was no record of the condition of the placenta. In Nos. 5 and 6 the other twin was described as well formed; in the former case also it was living, was delivered by forceps on account of a narrow pelvis, and soon thereafter the placenta and the monster were expelled. The placenta was single, but there were two umbilical cords and two amniotic cavities.

### Morbid Anatomy.

*a. Dimensions, etc.*—The fœtus was 6 inches long and 3 inches broad in No. 4; it was $3\frac{1}{4}$ inches long, $1\frac{1}{8}$ inch broad, nearly $1\frac{1}{2}$ inch thick, and weighed $3\frac{1}{16}$ oz. in No. 5; and it formed a large elongated ovate mass in No. 6. The head was distinct, but the trunk was so badly formed as to appear like a "mole" in No. 3; in No. 4 the head and trunk were marked off from each other by a very slight constriction; and in No. 5 the fœtus seemed at first sight to

be without form, but the cephalic end was the larger, and was marked by a small tract of hairy scalp.

*b. State of the Subcutaneous Tissue.*—In No. 4 no muscles or nerves were recognisable, but simply connective tissue with small clumps of fat; in No. 5 muscular bundles were found on the external aspect of the ribs and on the back; the subcutaneous tissue was œdematous, and contained large cystic cavities in No. 6.

*c. State of the Head.*—In No. 3 there was a mouth, some traces of eyes, and a rudimentary brain. The head in No. 4 was imperfectly marked off from the trunk; there were distinct traces of eyes, nose, and mouth, but there were no apertures, and the sense organs themselves were absent; a small fold of skin perhaps represented the left external ear; and above the cervical spine was a small lacunar bone with two ossicles lying anterior to it, but there were no facial bones, no cranial cavity, and no brain. The cephalic end showed a blind buccal aperture in No. 5, and there were rudiments of nose and ears. In No. 6 the cephalic end was covered with delicate brown skin and some hairs; there were three small apertures (mouth and orbits ?); the skeleton of the head was represented by a large occiput and masses of bone (the maxillæ) lying above the pharynx; the other bones of the head and face were not recognisable, but there were tympanic cavities.

*d. State of the Vertebral Column.*—In No. 4 the spine was complete, and was concave towards the right side; the cervical vertebræ were anchylosed; and there was no spinal cord, but a dropsical connective tissue, at some places merging into the dura mater, filled the canal. In No. 5 the spine consisted of seven cervical, nine dorsal, five lumbar, and four sacral vertebræ, and the canal below the axis was divided into compartments by an osseous septum. In No. 6 there was a spinal column containing the cord, but its spines were represented by a rod of cartilage, "probably the remains of the unsegmented investing mass highly developed" (Thomson Lowne).

*e. State of Limbs.*—The only trace of limbs in No. 3 was a cutaneous rudiment attached to the cartilaginous pelvis, and in No. 4 a small rounded wart lay at the left side of the thorax, and on each side was a scapula with a styliform cartilage attached to it. In No. 5 were three small projections of skin representing the two upper limbs and the left lower one; and in No. 6 there was also a small cutaneous tubercle at the left side of the lower end of the trunk. These fœtuses were, therefore, as nearly as possible, limbless.

*f. State of Thorax and Abdomen.*—In No. 3 the heart, lungs, liver, spleen, urinary and genital organs were absent, and the pelvis was cartilaginous. In No. 4 the ribs were normal as regards number, the sternum was divided, and the pelvis was well formed, but showed no acetabular cavities; there was no diaphragm, a con-

tinuous mass of connective tissue filled the thoraco-abdominal cavity, and there was a hernia above the insertion of the cord; the intestine was in three parts, continuous from head to anus, and its upper part (œsophagus) had some of the characters of the trachea; and the liver, spleen, pancreas, kidneys, and genitals were absent, but the bladder, urachus, and the rudiments of the two ureters were found. In Barkow's specimen (5) there were nine ribs on each side, a tract of intestine, in great part cord-like, ending blindly, and being surrounded by loose connective tissue, a bladder and urachus, and a parenchymatous vascular organ, six lines in length and four in breadth (liver ?). The thorax in No. 6 contained only areolar tissue; the abdomen was relatively large, and in it was a small stomach communicating with the pharynx by a narrow œsophagus, but having no pyloric orifice, two portions of intestine, the lower one of which opened at the anus, a horse-shoe kidney, a large Wolffian body with its duct, and a urinary bladder. In this case also the presence of the vagi and of the sympathetic ganglia was noted.

*g. State of External Genitals and Anus.*—In no specimen was the sex clearly recognisable. In No. 4 there was a small cutaneous node in the position of the external genitals, and behind it lay a pervious anus, but there was no urethral orifice. In No. 6 also the anus was pervious.

*h. State of Vascular System.*—Since no record concerning the state of the circulation in the placenta accompanied any of the cases, it is only possible to consider the vessels of the cord and those within the body of the fœtus. In No. 4 (Hempel's case) there were two vessels in the cord. One of these (a vein ?) entered the body, descended on the anterior abdominal wall, then passed backwards to form an arch which lay anterior to the lumbar spine, and then turned upwards, giving off branches on the way, to reach the upper end of the dorsal spine, where it divided into numerous twigs; and from the arch arose two vessels, one of which passed to the skin over the pubis, whilst the other descended into the pelvis. The other vessel (an artery ?) also passed downwards in the body to form an arch which near the sacral promontory sent off two branches, one of which passed up along the spine, lying first to the right, and then, crossing over to the left of the other vessel, gave off numerous branches, and ended near the left clavicle, whilst the other entered the spinal canal between the last lumbar body and the right ilium after giving off two branches (right and left iliacs ?). In Barkow's specimen (5) the umbilical cord also contained two vessels (a vein and an artery). The vein passed down along the left side of the urachus and bladder, then turned backwards, gave off a large branch to the supposed liver, and finally entered the right half of the spinal canal through the intervertebral foramen between the second and third lumbar vertebræ. The artery accompanied the vein in the first part of its

course, near the posterior end of the bladder it sent off a branch upwards along the spine, then turned forwards, gave a twig to the rudimentary liver, and finally passed upwards, giving off branches on the way, to terminate 1½ inch below the upper end of the fœtus in a group of diverging twigs. In No. 6 the vascular system was incompletely described, but there was an aorta running anterior to the vertebral column, and ending below in the two umbilical arteries, and above in the carotids and subclavians.

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## Literature.


*Paracephalus Apus Cardiacus.*

1. Müller (E.)—"Ein Acardiacus," *Archiv für Gynækologie*, Bd xvii. p. 303, 1881. Illustrated.
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## Group IV.—Paracephalus Pseudo-acormus.

The term *paracephalus pseudo-acormus* has been given by Taruffi[1] to all allantoido-angiopagous twins which consist solely of a more or less perfect head and a rudimentary trunk. It would appear that such fœtuses are slightly less rare than are those of the two previous groups (*p. monopus* and *p. apus*), for I have been able to find records of ten of them. They form a variety of monstrosity the existence of which was regarded with incredulity by all teratologists prior to the time of Saint-Hilaire, but whose occasional occurrence is now put beyond all doubt.

*Historical Notes.*—It is probable that the specimen described by Lycosthenes in 1557 (1), and afterwards figured in various works on monsters, was an authentic instance of the trunkless twin (or rather triplet); but his narrative was such as to throw grave doubt

[1] Taruffi (C.), *Storia della Teratologia*, vol. ii. p. 165, 1882.

upon the accuracy of the observation. He stated that in the town of Augusta a woman gave birth first to a human head enclosed in the membranes, then to a two-footed serpent with the head of a fish, the body of a frog, and the feet and tail of a lizard, and third to a pig. The occurrence, however, within late years of specimens closely resembling the above-mentioned head (so far as can be judged from the drawing) makes it probable that Lycosthenes was right in the part of his observation which at present concerns us. It was not till 1770 that a second specimen was recorded, that of Delamarre (2); J. F. Meckel (3) gave a short note of another in 1807; and Rudolphi (4) very fully described a triplet consisting only of head and neck in 1816. In 1836 Saint-Hilaire,[1] although he had not himself met with an acormic fœtus, and although he did not give such specimens a place in his scheme of classification, nevertheless warned his contemporaries against regarding their existence as mythical, and gave notes of the cases reported by Rudolphi, Delamarre, and J. Müller. He expressed some doubt as to whether such specimens were to be regarded as truly teratological or as due to accidental mutilations of a primarily more or less complete fœtus.

According to Taruffi, the specimen described by Nockher in 1837 (5) was one of paracephalus pseudo-acormus; but whilst recognising the resemblance which it bore to this type of monster, I must draw attention to the fact that it was attached by a pedicle, not to the placenta or cord of the co-twin, but to the body of the co-twin itself in the neighbourhood of the ensiform cartilage. It was, therefore, to use Taruffi's own nomenclature, a thoraco-parasitic fœtus, and not an omphalo-angiopagous twin. At the same time, it furnished an interesting proof of the close connexion existing between these twins and the parasitic monsters. Evidently there can be no great difference between the arrangement by which a rudimentary fœtus is attached to the umbilical vessels of its normal twin brother outside the body of the latter and that by which it is united to the same vessels inside the body. I am inclined to regard Nockher's specimen as the connecting link between typical allantoido-angiopagous twins and thoraco- and gastro-parasites.

Nicholson (6) reported a well-marked pseudo-acormus in 1837, which was probably the same specimen that had been noted by J. Müller in 1833, and by Paulitzki in 1834. Rumpholz (7) described his case in 1848, and in 1854 Barkow (8) put another instance on record, giving to it the name of pseudo-akormus. Förster[2] was the first to gather together all the above-mentioned specimens in one group under the name of *acardiacus akormus*, and to give their characteristic features. He was, however, in error when he stated

[1] Saint-Hilaire (Isidore Geoffroy), *Histoire des Anomalies*, vol. ii., note on p. 508. Paris, 1836.

[2] Förster (A.), *Missbildungen des Menschen*, p. 61, 1865.

that such fœtuses consisted of the head alone; and Lancereaux (
when he figured in 1875 a specimen of this kind belonging
Depaul, pointed out that in the addition to the head there w
usually a sacciform appendage containing some bones and traces
certain viscera. Ahlfeld[1] in 1880 adopted the correction of La
cereaux, and further stated that the vessels did not form a tr
umbilical cord as Förster believed, but passed separately from t
head in the membranes to the placenta. Taruffi,[2] in 1882, regard
the term pseudo-acormus as more correct than acormus, and calls
such fœtuses paracephali pseudo-acormi. Bompiani (10), in 188
described yet another acormic fœtus; but the specimen put o
record by H. J. Boldt[3] was evidently a fœtus anideus, and not
pseudo-acormus.

*Synonyms.*—The early writers did not give to their specimen
any one name, but generally stated at length that the trunk wa
absent,—thus Rudolphi styled his paper "Ueber eine menschlich
Missgeburt, die nur einem Theil des Kopfs und Halses besteht,
Nicholson called his "De monstro humano sine trunco nato," an
Rumpholz used the phrase "De monstro trunco carente." Tru
synonyms are *acardiacus acormus* (Förster, Ahlfeld, and others
*paracephalus pseudo-acormus* (Taruffi), and *asomatic omphalosi*
(Hirst and Piersol[4]). With regard to the term *cephalide*, intro
duced by Dareste[5] and adopted by Guinard,[6] it must be remem
bered that it was used by the former writer to designate certai
embryo chicks artificially produced, consisting of cephalic extremit
alone, and not accompanied by a twin, so that it will be best no
to employ it as synonymous with the human pseudo-acormus.

## Clinical Details.

With this group of allantoido-angiopagous twins, as with others
the clinical details given by the observers are very incomplete
In No. 4 it was stated that the parents were healthy and well
formed, that there were no hereditary maladies in their families
and that the mother had met with no accident in pregnancy. In
No. 6 the mother was said to be in bad health. The pregnancy o
which the product was the monstrous fœtus was always plural
and in two instances (Nos. 1 and 4) there were two other infants
besides the deformed one. In No. 1 it would appear that the
acormic fœtus was born first; but in Nos. 2, 3, 4, 5, and 7 it was
definitely stated the normal fœtus (or fœtuses) appeared before the

[1] Ahlfeld (F.), *Die Missbildungen des Menschen*, p. 41, 1880.
[2] Taruffi (C.), *Storia della Teratologia*, ii. p. 165, 1882.
[3] Boldt (H. J.), *American Journ. of Obstetrics*, xxii. pp. 403 and 1292, 1889.
[4] Hirst (B. C.) and Piersol (G. A.), *Human Monstrosities*, Part iii. p. 139, 1892.
[5] Dareste (C.), *Production des Monstruosités*, pp. 486 and 498, second edition, 1891.
[6] Guinard (L.), *Précis de Tératologie*, p. 406, 1893.

monstrous one. In most of the cases the delivery was not difficult; but in No. 5 the normal fœtus presented by the abdomen, and its cord, as well as the pedicle of the trunkless head, which was inserted near the ensiform cartilage, could be felt *per vaginam;* the cord was ligatured, and the normal fœtus, which was mature and well nourished but dead, was removed, and the separate head, which was hydrocephalic, was extracted with forceps. In No. 7 the acormus was born three days after the normal fœtus and placenta. In three instances (3, 6, and 7) the co-twin was described as normal; but in some of the cases the other fœtus (or fœtuses) was deformed. They evidently were so in No. 1, although the imagination of the observer, no doubt, ran riot in framing the description of them. In No. 4, in which there were also three fœtuses, the first born, a male, 14 in. long and weighing 4 lbs. 8 oz., was well formed save for the smallness of the fontanelle, and died soon after birth, whilst the third born was smaller than the first, weighed 2 lbs. 8 oz. and measured 11 in., and died some hours after birth. In No. 2 the first born, a male, had complete spina bifida with a sac as large as its head in the sacral region, atresia ani, and transposition of heart and stomach to the right side. In No. 4 the co-twin showed on the right side of the abdomen a deficiency in the skin which allowed the liver covered with peritoneum to protrude, and in its pleural cavities was some reddish serum. It will thus be seen that in this group of allantoido-angiopagi more than in any of those previously considered the fœtus (or fœtuses) born along with the markedly monstrous one could scarcely be called normal. In Nos. 2 and 7 it was a male, in No. 3 a female, and in No. 5 it was probably also a male. In No. 4 the first born was a boy, and there is no statement as to the sex of the fœtus which had its placenta in common with the trunkless head. Of course it was impossible to discover the sex of the acormic fœtus.

## Morbid Anatomy.

### I. Of the Fœtus.

If we can accept the drawing as accurate, the head of which the fœtus in No. 1 consisted was remarkably well formed, and was inserted directly upon the membranes. In No. 2 there were two parietals, a frontal and an occipital bone, and these, together with the basis cranii, formed a kind of head covered by a membrane and furnished with mouth, eyes, ears, and nose. The fœtus in No. 3 was described as a fleshy body, as large as an infant's head, with nose, mouth, ears, and eyes externally, and with distinct bones in the interior.

Rudolphi (No. 4) gave a good description of his acormic specimen. The head, which weighed 4½ oz., was hemicephalic, and on the exposed basis cranii and nape of the neck lay a mass like a

fungus hæmatodes. Such bones as were present were well ossified. The face was well formed, but the buccal cavity was closed posteriorly. The head was regularly continuous with the neck, the skin of which formed a funnel-shaped prolongation, from the interior of which hung a small sac. The sac was 1 inch in length and [illegible] lines in breadth, and was divided by a septum into two parts, which contained a greyish material and communicated with each other by a small aperture: this was probably a rudimentary heart although Rudolphi himself did not think so, but regarded it simply as a sacciform tumour. In the neck the larynx and thyroid gland were absent, but there was the beginning of the spinal cord, which was in a dropsical state and surrounded by two membranes. In the funnel-shaped portion of skin ran three vessels: one of these a vein, was cut at both ends, and could not therefore be traced the two others were like arteries, and both proceeded to the right side of the neck,—the larger one was regarded as the carotid, the smaller as the vertebral, and they both had several branches.

The head in No. 5 was hydrocephalic, and its pedicle, which was only ½ inch in length, contained some ligamentous fibres, and very rudimentary vertebræ. With regard to the face, the nose was present, but there were only traces of the eyes and ears. On the lower jaw on each side was found a fleshy mass, which when incised had a yellowish colour and a glandular appearance. The pharynx ended blindly, and the brain, which was much degenerated was of a reddish colour. Several bloodvessels were seen on the neck, running to the thorax and abdomen of the co-twin. In Nicholson's case (No. 6) the head was pseudo-hemicephalic, the vault bones being depressed, and the brain, a fungous mass, was covered by a thin membrane and surrounded by a corona of hairs. There was a mouth ending blindly posteriorly, furnished with a small tongue and having serrated gums. The nose contained no bone, was formed by a cutaneous fold, and showed only one aperture. There were traces of the eyes, but the eyeballs were absent. There was a right external ear, containing no cartilages, and with a blind meatus; the left ear was very rudimentary. The head and face rested upon an irregular skin-covered tumour, attached to which were two sacs. One of these, the larger, was situated at the right side posteriorly, and contained a piece of bone; in the other, smaller and lying to the left, was found a fibrous cord. In front of these sacs, and immediately below and behind the ears, was an ovoid swelling, into which the umbilical vessels passed. These vessels consisted of a large vein, which sent two small branches to the face, two deep ones to the cranial cavity, and some twigs to the coils of intestine and to a gland in their neighbourhood; and of an arterial trunk, which passed round the intestine, gave branches to the gland, to the intestine, and to the head, and from which arose the lingual artery.

The only nerve found was the hypoglossal, and it accompanied

the lingual artery. Immediately under the basis cranii lay the viscera. These consisted of the gland above mentioned, which was of triangular form, and may have been a thymus, a thyroid, or possibly a rudimentary liver; a few coils of intestine, with a small sac, probably the stomach; and traces of the thyroid cartilage and of the beginning of the trachea. A long thin bone was attached to the lower surface of the basis cranii, and there were some rudimentary ribs. The bones of the vault and base were deformed, and the most striking abnormality was the articulation of the zygoma of the temporal with the coronoid process of the lower jaw and with the malar bone. One nasal bone was present.

The acormic fœtus described by Rumpholz (No. 7) was reniform, and had it not been for the traces of some parts of the face near the hair covered end, would have had all the external characters of an anidean monster. It was 4½ inches in length and 3 inches in breadth and thickness, and at one point there was a depression into which passed the umbilical cord. It was covered with skin, and the subcutaneous tissue had an œdematous appearance. There was no fat in the subcutaneous tissue of the part of the fœtus corresponding to the head, but in the rest of the body it was present in large amount. There was a single eye with a projection above it (cyclops and proboscis), and there was an aperture opening into what was probably a blind buccal cavity. There were no thoracic or abdominal viscera. The head was made up of a relatively large osseous cranium (1⅓ inch long and 1 inch broad), covered externally by periosteum, and on the inside by two membranes (dura and arachnoid), rich in vessels and pigment, and containing anteriorly some serum and posteriorly a soft brain-like mass. The bones of the base and of the face were quite recognisable, but deformed in various ways. The foramen magnum was very large, and from it there hung a sac formed by dura mater, and containing a rudimentary spinal cord. The traces of three vertebræ were found surrounding this sac.

Barkow's specimen (No. 8) resembled Rudolphi's. The only traces of the body were some rudimentary vertebræ and ribs, and some of the muscles of the trunk. All the parts of the face were present, although not well formed. An imperfect brain, spinal cord, and spinal nerves were found; and there was an incomplete intestinal tract, the greater part of which was enclosed within a peritoneal sac. Depaul's fœtus (No. 9), figured by Lancereaux, was very like Barkow's. The right ear and eye were recognisable, the left not so; whilst the mouth and nose were represented by irregular projections and depressions, below which the vessels entered the mass.

II. Of the Placenta and Cord.

In No. 1 the head was directly attached to the membranes, and nothing was said of the placenta. In No. 2 a kind of umbilical

cord passed from the acormus to the single placenta. In Rudolphi's case (No. 4) the second born fœtus and the separate head had a common placenta and membranes; the umbilical cord contained two arteries and two veins, and at a distance of 5½ inches from the placenta one vein left the cord to pass to the acormus, whilst one of the arteries gave off a branch near the placenta, which re-descended and at a distance of 3½ inches also left the cord to go to the accessory head. These two vessels passed to the membranous sac enclosing the head. In No. 5 the vessels of the head passed directly to the body of the co-twin. The acormic fœtus in No. 6 was attached to the common placenta by a small vessel at some distance from the placental insertion of the cord of the normal twin.

In No. 7 there was a single placenta, which was said to have a normal appearance, but the author (Rumpholz) was unable to examine it. The acormus in No. 8 was contained in the same sac as the normal twin, and was supplied by a branch of the umbilical artery of the latter, which arose from the single placenta. This branch passed into what was regarded as the aorta of the monster, a vessel which divided into the two carotids. The jugular vein opened into a superior vena cava, which left the acormus to form an arch on the surface of the placenta, and then joined the umbilical cord to enter the body of the normal twin. This communicating vein was regarded as the omphalo-mesenteric of the monster, but no trace of the arteries or of the umbilical vesicle was found. In the cord of the normal twin were two umbilical arteries, an umbilical vein, an omphalo-mesenteric vein, and the urachus.

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*The President* thought Dr Ballantyne was to be congratulated on having been able to pursue his studies in Teratology to such good purpose. The series of observations would add greatly to the value of the Society's *Transactions*, and render the volume for this year a mine of information in this interesting field of research for all coming time.

## IV. ON PAROTITIS FOLLOWING OPERATIONS ON THE ABDOMINO-PELVIC ORGANS.

By N. T. BREWIS, M.B., F.R.C.P.E., Lecturer on Gynæcology, Edinburgh School of Medicine; Gynæcologist, New Town Dispensary; Secretary, Edinburgh Obstetrical Society.

THE testicle, the ovary, and the breast, as is well known, sometimes sympathise with the parotid gland in the course of mumps. Orchitis occurs as often as once in every sixty cases, and from this fact it may be held as beyond doubt that there is some nerve connexion between the parotid and the above-mentioned glands. The many recorded cases of parotitis subsequent to ovariotomy show that the sympathetic current may be reversed. The following case of suppurative parotitis after laparotomy for removal of the uterine appendages recently occurred in my practice:—

Mrs W., æt. 29, nonipara, married ten years, was admitted into the Cambridge Street Home for Women on the 1st of April 1893, complaining of constant pain in the sides and back. Her symptoms began three months after marriage, and have continued ever since. The pain, which was constantly present, was unbearable at the periods and after slight exertion. She has had frequent and painful micturition from the commencement of her illness more or less up to the present time.

*Physical Examination.*—Vaginal portion normal; body of uterus acutely bent on the cervix, small, round, hard, tender, and freely movable. Both ovaries were considered smaller than natural. The examination caused great pain.

*Diagnosis.*—Acute anteflexion, and chronic inflammation of the appendages, probably of specific origin.

Palliative treatment had been tried for some months without any improvement of the patient's condition, so on the 24th May abdominal section was performed and the appendages removed. The omentum was adherent over a considerable surface of the anterior abdominal wall, and required careful ligaturing. There were also pelvic adhesions, which necessitated severe handling of the ovaries. A small sponge was lost, and a somewhat prolonged search was made before it was recovered. In other respects the operation presented nothing unusual. Both ovaries were small and cirrhotic, and the tubes were markedly congested. The patient made a good recovery from the operation. The temperature remained at 99°, except on one occasion,—on the evening of the 25th, when it registered 100°.

On the evening of the 29th (five days after operation) the temperature rose to 100°, and the patient complained of slight soreness in the throat, stiffness, and swelling in the parotid region. A pad of wool was applied over the part, and 5 grs. of quinine ordered to be taken three times a day. On the evening of the 30th the swelling had increased; she complained of pain and deafness, which were evidently due to œdema of the floor of the meatus. From this date till the 6th of June warm boracic fomentations were used; pus was then seen oozing from the ear, the swelling having spread down the neck, over the mastoid process and the infra-maxillary region. Indistinct fluctuation was made out. The meatus was well syringed out with warm carbolic lotion, dusted with iodoform, and covered with a pad of corrosive wool. Three incisions were then made into the swelling by Hilton's method, from each of which thick healthy pus exuded, being drainage-tubes inserted into each. On syringing the upper tube the lotion passed into the meatus through a small opening in the floor, which explained the pus coming from the ear, as before mentioned. A dressing of iodoform gauze was applied. The after-treatment consisted in daily syringing the ear with warm carbolic acid lotion, dusting with iodoform, and dressing with the gauze. By June 13th the temperature was normal, the swelling and pus had nearly disappeared, there was no œdema of the meatus, and the hearing was perfect. The tympanum was found healthy. On June 28th the patient left the Home.

Mr Skene Keith recorded, in vol. xi. of the Society's *Transactions*, a case of suppurative parotitis after removal of an ordinary multiocular tumour of the right ovary. The symptoms in that case were similar to those I have just related. Schröder had five cases of parotid bubo, two of which ended fatally, in 200 cases of ovariotomy. Goodall mentions three examples of parotitis which occurred in his practice. Dr Sutton refers to a case in which one gland after the other began to swell during convalescence after

ovariotomy, the patient dying during the third week. Dr Johnston reports a similar case, which resulted fatally on the ninth day. Dr Mann relates two cases; one was fatal with septic symptoms, the other recovered. Drs Baker and Reamy each record a case after Tait's operation. I remember two cases which took place after ovariotomies performed by Dr Macdonald.

The ovary and testicle, however, are not the only organs in sympathy with the parotid, and the latter gland in camels enlarges during the breeding season. The salivation which occasionally accompanies pregnancy demonstrates a nerve bond probably between the uterus and the parotid. Operations on the uterus have been followed by parotitis. Goodall met with a case of suppurative parotitis after incision of the neck of the uterus. Emmet mentions one after an operation for laceration of the cervix. Dr Reamy had a case following hysterectomy; Dr Stephen Paget cites one that occurred after the introduction of a pessary into the vagina, and another that followed circumcision; and Dr Connell records a case of suppurative parotitis after removal of the breast.

While these cases go to show that there is a sympathetic connexion between the salivary glands and the sexual organs, other authentically recorded cases would indicate that the parotid has yet a wider connexion. Instances of parotitis are known to have followed penetrating wounds of the abdomen, the operations of gastrotomy and gastrostomy, the evacuation of an abscess round the vermiform appendix, the operation of lithotomy, and repair of a vesico-vaginal fistula. These cases following injury, not of the genital organs, but of the abdominal viscera and peritoneum, may perhaps show that the relation of mumps to orchitis is not due to any connexion between the salivary glands and sexual organs, but, as Dr Stephen Paget suggests, to sympathy between the glands at the commencement of the alimentary canal and the peritoneum.

In conclusion, I think we may regard the parotitis which comes on after operation in the sexual and abdominal organs as the result of a reverse sympathy; that cases which run through a course like mumps, ending in resolution, are due to this nerve connexion alone; but that those cases which suppurate while sharing the sympathetic relation, must, from the number of fatal results which occur, be regarded as involved in septic intoxication. In suppurative cases which do not terminate fatally, we may consider that the septicæmia has exploded in the parotid glands.

V. *Dr C. C. Easterbrook* communicated his METHOD OF INVESTIGATION OF AN OBSTETRICAL CASE, especially for hospital practice.

## VI. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL FOR DR UNDERHILL'S QUARTER, MAY TO JULY (INCLUSIVE) 1892.

By A. CHAS. E. GRAY, M.B., C.M., and CLAUDE B. KER, M.B., C.M.

### INTERN CASES.

DURING the quarter 73 women were delivered in the Hospital, 24 of whom were married; 37 were i.-paræ, 22 ii.-paræ, 2 iii.-paræ, 4 iv.-paræ, 3 v.-paræ, 4 viii.-paræ, 1 xii.-para.

*Age.*—(*a.*) Primiparæ—average age, 21·89 years; youngest, 15 years; oldest, 39 years. (*b.*) Multiparæ—average age, 28·16 years; youngest, 21 years; oldest, 41 years.

*Duration of Labour.*—As it is obviously impossible in a large proportion of the cases to determine with any accuracy the termination of the 1st stage, the 1st and 2nd stages are placed together. (*a.*) Primiparæ—average duration of 1st and 2nd stages, 14 h. 32 m.; longest, 25 h. 30 m.; shortest, 6 h. Average duration of 3rd stage, 15 m.; longest, 30 m.; shortest, 1 sec. Average duration of whole labour, 14 h. 45 m.; longest, 25 h. 45 m.; shortest, 6 h. 15 m. (*b.*) Multiparæ—average duration of 1st and 2nd stages, 10 h. 3 m.; longest, 52 h.; shortest, 1 h. 30 m. Average duration of 3rd stage, 12 m.; longest, 30 m.; shortest, 1 sec. Average duration of whole labour, 10 h. 14 m.; longest, 52 h. 5 m.; shortest, 1 h. 50 m.

*Presentations and Positions.*—(*a.*) Primiparæ—1. Longitudinal: (1.) Cephalic, 34; L.O.A., 27; R.O.A., 0; R.O.P., 2; L.O.P., 1; Occ. læva, transverse at brim, 1; Uncertain, 3. (2.) Pelvic breech, R.S.A., 1. 2. Transverse, 0; total, 35. (*b.*) Multiparæ—1. Longitudinal: (1.) Cephalic, 28; L.O.A., 24; L.O.P., 0; R.O.A., 1; R.O.P., 1; Occ. læva, transverse at brim, 1; Uncertain, 1. (2.) Pelvic breech, 4; L.S.A., 3; R.S.P. 1. 2. Transverse, 1; total, 33.

*Sex and Weight of Children.*—Primiparæ gave birth to 15 males and 21 females. Average male weight, 7 lbs. ¼ oz.; heaviest, 8 lbs. 3 oz. Average female weight, 6 lbs. 8½ oz.; heaviest, 8 lbs. 8 oz. Multiparæ gave birth to 15 males and 19 females. Average male weight, 7 lbs. 2 oz.; heaviest, 10 lbs. 8 oz. Average female weight, 6 lbs. 11 oz.; heaviest, 8 lbs. 8 oz.

*Length of Children.*—Average male, 19⅝ in.; longest, 21 in. Average female, 18⅞ in.; longest, 21½ in.

*Placentæ.*—Average weight of male placentæ was 1 lb. 5⅓ oz.; heaviest, 1 lb. 15 oz.; lightest, 13 oz. Average weight of female placentæ, 1 lb. 5⅔ oz.; heaviest, 2 lbs.; lightest, 12 oz.

*Cords.*—The average length of male cord was 21¼ in.; longest, 28 in.; shortest, 13 in. Average length of female cord, 20⅛ in.; longest, 34 in.; shortest, 11 in. The insertion in two cases was velamentous.

*Peculiarities of Children.*—In one case an anencephalous monster was born prematurely. In another a full-time child was born with a hare-lip and cleft palate.

*Classification of Labours.*—Natural, 52; laborious, 6; præternatural, 6; complex, 5; abortions, 4.

*Natural Labours.*—In three cases the second stage was precipitate.

*Laborious.*—These were all cases of delay in the second stage, necessitating assistance by application of low forceps.

*Præternatural.*—Five were cases of breech presentation; one of transverse presentation, which was also premature.

*Complex.*—Two were cases of contracted pelvis, in one of which premature labour was induced; one was a case of adherent membranes and post-partum hæmorrhage, one a case of eclampsia, and one a case of twins which were both decomposing.

*Abortions.*—One of these was between the second and third month, one at third month, and two were about the fifth month.

*Ophthalmia neonatorum* occurred in one case, which was successfully treated with a 20 grs.-ʒj. solution of silver nitrate.

*Puerperium.*—One case of peritonitis occurred, which proved fatal in three days, and which is detailed below. In a second case there was phlebitis of the right femoral vein and some parametritis. The patient was kept in hospital for six weeks, and ultimately discharged perfectly recovered. In no other cases did any irregularity worthy of note occur.

*Mortality:*—(1.) *Maternal*, 2. One was a case of eclampsia, the other of peritonitis, both detailed below.

(2.) *Fœtal*, 15. Four of these were abortions, 5 were putrid at time of delivery, 2 were breech cases in which the head became jammed in the pelvis, and before the child could be extracted death occurred. One was a case of cranioclasm for contracted pelvis. Two were cases in which undue pressure in a contracted pelvis caused death of children. One was the case of the monster referred to.

(3.) *Infantile*, 0.

*Case of Peritonitis.*

Mary R., æt. 19, admitted to hospital at 1·10 P.M. on May 31st, 1892. Primipara. Menstruated last in November (?), and felt stirrage first in February. Had been treated in January, at the Royal Infirmary, for an obscure injury on the right side, the result of a fall. In other respects her previous health had been good.

Was delivered at 2·12 P.M. of the 31st, after a perfectly normal labour lasting fourteen hours, of a healthy, well-developed female child. Four hours after delivery the temperature was found to be 102°·2, pulse 132 per minute, and pain was complained of over the lower part of the abdomen. The next day the abdominal pain had become general, the abdomen tense and exquisitely tender, knees

drawn up, face pinched and anxious-looking, pulse small and rapid, temperature in the morning 100°·2, evening 104°·4. She was treated with intra-uterine douches, fomentations to the abdomen, morphia hypodermically and by the mouth, antipyrin and brandy. On the next day the patient was weaker. She sank rapidly, and died on the evening of the 3rd June, the temperature just before death being 104°·4.

A post-mortem examination was performed the next day by Dr Leith, of the report of which the following is an extract:—

"*Abdomen* showed a diffuse peritonitis with flakes of purulent lymph scattered sparsely over coils of intestine, extending up as far as stomach and liver. Exudation more marked at brim of pelvis on left side, and seemed to spread upwards from the lateral and posterior surface of the uterus, but no clear signs of this.

"*Uterus* large, thick-walled; showed well the placental site. Nothing abnormal about it. The left ovary was in a state of chronic oophoritis, and was a little enlarged. It showed pale fibrous-looking areas in its substance, but very little abnormality about it. The other ovary was smaller and less firm."

*Case of Anencephalous Monster.*

Mrs M., æt. 41, admitted to hospital on Monday, May 9th, at 6.10 P.M. with history that to assist in diagnosis of a supposed abdominal tumour a uterine sound had been passed the same afternoon, causing rupture of membranes and escape of a very large quantity of liquor amnii.

Menstruated last in October 1891. Had four children, the youngest of whom was 7 years old. For some time past had been troubled with swelling of the abdomen, but had felt no fœtal movements, and did not suspect pregnancy. The patient was nervous and somewhat wasted looking.

At the time of admission to hospital the fœtal heart could not be heard; there were no pains, and on examination per vaginam the os only admitted the tip of the finger. At 10 P.M., no pains having occurred, the os was dilated by manipulation sufficiently to admit the tip of two fingers, and it was then found that the left hand and right elbow were presenting together. As the cervix resisted further efforts at dilatation, and as there was some hæmorrhage, the vagina was plugged, ⅛ gr. of morphia administered, and the patient kept under observation during the night. At 11 next morning, chloroform having been administered, Dr Underhill removed the plugs, and having succeeded in introducing four fingers into the uterus, he turned with considerable difficulty and brought down the left foot. One and a half hours after, some pains having come on, the child was delivered with the assistance of slight traction on the foot. The placenta was delivered naturally a few minutes after.

The child proved to be an anencephalous monster, with spina bifida and exomphalos, the cord being spread out and inserted into the umbilical swelling. Rupture of the cord at its very slender insertion had taken place, probably during the manipulations.

On the morning of the second day after, the patient's temperature rose to 103°·8, the pulse being 122 per minute. There was no pain or tenderness, and the vaginal discharge was quite sweet. An intra-uterine douche of 1–4000 corrosive sublimate was administered, and on the evening of the next day the temperature fell to normal. The subsequent recovery was uninterrupted.

*Cases of Contracted Pelvis.*

(*a.*) Mrs M'G., aged 25, primipara, small and ill-developed, with pendulous belly. The first stage lasted twenty-three hours; the presentation could only be felt with difficulty, the head being very high up. The vagina was very small, and there seemed to be contraction at the outlet. The os dilated very slowly, and had to be assisted by manipulation with the fingers. At about 9·30 on the evening of May 26th the membranes ruptured, and the os was fairly well dilated. The head was lying in the transverse diameter at the brim, having apparently started in the R.O.P. position. The cervix hung like a loose bag below. At 11·15 P.M. Dr Milne Murray tried to apply forceps over the occiput and sinciput, but, owing to the narrowness of the pelvic cavity and outlet, failed. After many attempts, he finally applied his instruments in the ordinary way, and at 12·10 A.M. delivered a dead fœtus, weighing 8½ lbs., with head diameters all above the average. The diameters were as follows:—Interspinous, 9 inches; intercristal, 9½ inches; diagonalis, 4¼ inches; vera, 3¾ inches. The patient required her water to be drawn off for several days, and developed pelvic cellulitis on the right side, which kept her temperature above normal for a fortnight. After this she suffered from inflammation in the veins of her right thigh, requiring blisters. She was not discharged till the fifty-seventh day of her puerperium.

(*b.*) Mary B., aged 24, secundipara. Two years previously had been delivered in the hospital by turning, and had been told to come in at the seventh month should she again become pregnant. She stated she had menstruated last in November. She came in on June 16th. Her pelvic diameters were as follows:—Interspinous, 9¾ inches; intercristal, 10⅝ inches; external conjugate, 6¼ inches; diagonal, 3¾ inches; true, 3¼ inches. At 4 P.M. on June 20th Dr Underhill induced premature labour by the introduction of a bougie. The breech presented in the L.S.A. position. The second stage began at 6·30 P.M. on June 22nd, and progressed rapidly till the head stuck at the brim. When Dr Underhill ultimately extracted the dead fœtus, the right parietal bone was found deeply indented by pressure on the promontory. The child weighed 6½

lbs., and appeared much nearer full-time than the woman's account of her menstruation had indicated.

(*c.*) Mrs M'G., aged 26, secundipara. Admitted at 9·30 P.M., June 27th, with a history of having been delivered by basilysis by Dr Barbour eighteen months previously (*vide Transactions*, vol. xvi.). She was very short, thick set, and rickety. She stated that the pains had begun at 7·30 P.M. On examination, the os found three parts dilated, and the most noticeable feature was the ease with which the promontory was reached. The head was above the brim. The pelvic measurements were:—Interspinous, 9 inches; intercristal, 9½ inches; external conjugate, 7 inches; diagonal, 3½ inches; true, 3 inches. Dr Underhill was at once sent for, but unfortunately the membranes ruptured just as he arrived at 11·15 P.M. After an attempt to turn, which failed, he put on forceps, and endeavoured for nearly half an hour to drag the head through, but without success. He then perforated—the head having been fixed from above—and broke up the cranium with Braun's cranioclast, the operation being lengthy and tedious. Ultimately the fœtus was extracted by the cranioclast at 12·30 A.M. on June 28th. In spite of the handling she unavoidably received, the patient made a most favourable recovery, never having a rise of temperature, and leaving hospital in a fortnight.

### *Cases of Eclampsia.*

(*a.*) Mrs L., aged 36. Admitted June 13th. *History.*—She had three previous pregnancies, the first normal. The second was complicated with convulsions at the seventh month. The convulsions had succeeded each other in quick succession, and she was unconscious for eight hours. She had no recurrence, and went on to full term. In her third pregnancy she again had convulsions at the seventh month, which recurred during the last two months of her pregnancy, and also during her puerperium, and for several months thereafter. She was never long unconscious, and was improved by bromide and chloral. The last fit was ten months ago. Albumen was only noticed in her urine immediately after the fits.

*Present Condition.*—There was no account of when this pregnancy began. In the middle of May she complained of headache and loss of memory. She stated she had a fit, which no one saw. No albumen in the urine at that time, but her medical attendant noticed a slight drawing up of the right side of the mouth and a weakness in the grasp of the left hand. Two days later she could not hold a cup in that hand; unable to walk, and for several days suffered from incontinence of urine. On admission appeared to be at seventh month. The right side of the mouth was drawn up, the left side of the body paretic. The tongue protruded to the left. The pupils were equal and their reaction normal. The sensibility was normal. She was very confused mentally, was

vomiting constantly and without effort. Had passed no urine all day.

*Treatment.*—Was given croton oil ♏ij. with no effect. Fomentations of cacumina scoparii over the loins. An enema given with no result. Acetates of ammonia and potash given freely. At midnight, as she had passed no water, an instrument was passed, but only drew off 2½ oz., containing a little albumen. Pilocarpine ⅙ gr. hypodermically sweated her profusely.

Following extracts from notes of the case show her progress:—

*June* 14.—Still vomiting. Pulv. elaterin. co. 5 grs. repeated with no effect. Pilocarpine as before. Passed 8½ oz. of urine.

*June* 15.—Vomiting less. Less confused. Jalapine 5 grs. repeated with an enema had no effect. Pilocarpine. Passed 7½ oz. of urine.

*June* 16.—Elaterin ¼ gr. twice repeated gave for first time a loose motion. Pilocarpine as before. Sweated well. Passed 10 oz.

*June* 17.—Slight convulsion, lasting three minutes, mostly on right side, commencing in mouth. After this she continued to make steady improvement. The bowels were made to move three or four times daily. The fomentations were continued. On the 23rd, 24 oz. of urine with a trace of albumen were passed. The urea was 5 gr. per oz.

On 29th had a precipitate labour. Child little more than at seventh month, was wrapped in wool, the weather being warm enough to dispense with the incubator. Both mother and child did well. The urine increased; on seventh day passed 39 oz. From that time it decreased. The facial paralysis improved, while that of the leg and arm became worse. On the tenth day began to pass fæces and urine unconsciously, thus preventing the measurement of the urine. Elaterin and pilocarpine were begun again. On the thirteenth, however, the latter caused œdema of the lungs, and she nearly died, but recovered on prompt dry cupping over the bases. A hot-air bath was given daily instead of pilocarpine. She afterwards developed œdema of the left side and bed sores, and was removed to the Infirmary, her mental condition being much better. The child did well.

(*b.*) Mrs B., aged 25, primipara. Admitted 11 A.M. July 25th. She was at full term, and had been well up to a few days previously, when she had complained of headache. At 2 P.M. on the previous afternoon suddenly lost her sight. At 3 P.M. convulsions began, and she had twenty-one distinct attacks from that time up to her admission. They were treated with chloroform. On admission she was unconscious. She moved when touched. Appeared to be moribund. Dr Underhill ordered croton oil ♏iij. and a hot-air bath. She had no urine in her bladder, and had passed none for twenty-four hours. There was no uræmic odour of the breath. She was in labour, the cervix being taken up, and the os the size of a shilling. Her temperature was 102° F., and she was suffering

from great œdema of the lungs. At 3·30 P.M., there being no movement of the bowels, Dr Underhill took off 14 oz. of blood from the right arm and dry cupped her over the lungs. She temporarily improved. Was put in another hot-air bath at 5 P.M., and elaterin was again given. She died, however, at 5·25 P.M. of intense pulmonary œdema.

The child was extracted by Dr Underhill per *vias naturales* by slitting up the cervix and putting on forceps. It had, however, been dead some time, and was peeling.

The post-mortem examination showed old-standing renal inflammation and recent tubular nephritis. The lungs were œdematous, and contained old tubercular nodules. There was no œdema of the brain. The immediate cause of death was the œdema of the lungs.

## Extern Report.

The outdoor cases attended by the Hospital staff numbered 132. Of these, 13 were primiparæ and 119 multiparæ. There was one maternal death, and of the 136 viable children born 13 were stillborn and 4 died shortly after birth. Of the children 69 were males and 67 females.

*Classification of Labours.*—The labours may be divided into 112 natural, 3 præternatural, 4 laborious, and 10 complex. There were 3 abortions.

*Præternatural.*—The 3 præternatural labours comprised 2 breech cases and one transverse, which was delivered by turning.

Of the 4 *laborious* labours, all were instrumental. Three required the use of forceps for delay in the second stage, and 1 for persistent occipito-posterior position.

Of the *complex labours* 7 were cases of twins. In these both children were alive in 4 cases, both dead in 1, while in the remaining 2 one child survived. There was 1 case of fatal post-partum hæmorrhage, 1 case of hydrocephalus, and 1 case of retained placenta.

Two of the 3 *abortions* took place at the third month. The remaining case occurred about the ninth or tenth week. In one case the temperature was high for several days, and the uterus was douched daily with a weak solution of perchloride of mercury.

*Presentations.*—The presentation of the 136 viable children was in 129 cases cephalic (all vertex), in 6 cases pelvic, and in 1 transverse.

*Position.*—The positions of the vertex cases were as follows:—L.O.A., 116; R.O.A., 1; L.O.P., 0; and R.O.P., 12. Of the breech cases 4 were L.S.A., and the position of the remaining 2 was unascertained.

### *Reports of Special Cases.*

(1.) *Fatal Post-partum Hæmorrhage.*—Mrs H., aged 29, nonipara, badly nourished, fell in labour at about 9 P.M., and was

attended by a midwife with no qualification. At about 1 A.M. on the following morning she had a profuse hæmorrhage, filling a chamber-pot. The midwife got alarmed, and after concealing all traces of the hæmorrhage, sent to the Maternity. The students arrived to take charge at about 3 A.M., and did not think the woman very bloodless. She had a slight oozing of blood, but unfortunately no help was sent for. At 5 A.M. the child and placenta were expelled together, followed by profuse flooding. This ultimately seemed to cease after douches of hot water, and about half an hour after the binder was put on, it being stated that the uterus was contracted. About half an hour later she was found to be again bleeding profusely, and the students sent for help. On the house-surgeon's arrival the patient was moribund, and though no blood was lost after his arrival, she died in spite of every endeavour to save her by the usual means. Owing to the want of observation in the early part of the case, it is impossible to say whether the case was one of placenta prævia or accidental hæmorrhage. The placenta was unfortunately destroyed, but was said to have yellow patches on its surface.

(2.) *Hydrocephalus.*—Mrs R., nonipara, was attended on July 14th from the hospital. The fœtus presented by the breech on the left sacro-anterior position, and all went well till it was found impossible to deliver the head. The ordinary manipulations having failed, Dr Milne Murray was sent for. The abdominal tumour was still up to the ensiform cartilage. Dr Murray perforated, and 60 oz. of fluid was collected, the abdominal tumour gradually disappearing. The fœtus was then easily extracted. It was well-nourished and large. The bones of the head were thickened and widely separated.

## VII. REPORT OF THE EDINBURGH ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL FOR PROF. SIMPSON'S QUARTER (FROM 1ST NOVEMBER 1892 TO 31ST JANUARY 1893).

By CHARLES C. EASTERBROOK, M.A., M.B., C.M. (Scott Scholar, 1892), and WALTER PETRIE SIMPSON, M.B., C.M.

### Intern Practice.

#### A. GENERAL FACTS.

*Number of cases,* 65: Primiparæ, 33; multiparæ, 32 (ii.-paræ, 19; iii.-paræ, 4; iv.-paræ, 4; v.-paræ, 2; vi.-para, 1; ix.-para, 1; xi.-para, 1). Single, 44 (i.-paræ, 28; ii.-paræ, 14; iii.-para, 1; iv.-para, 1); married, 21 (i.-paræ, 5; ii.-paræ, 5; iii.-paræ, 3; iv.-paræ, 3; v.-paræ, 2; vi.-para, 1; ix.-para, 1; xi.-para, 1).

*Ages* varied from 17 to 39 years (below 20 years, 7; between 20 and 30 years, 54; above 30 years, 4).

*Occupation of Single Patients.*—Chiefly domestic servants, but also dairymaids and farm-workers and mill-workers.

*Menstrual Histories of Patients:—Year of puberty*—at 11 (1), 12 (1), 13 (6), 14 (11), 15 (21), 16 (8), 17 (9), 18 (2), and 19 (1). *Type*—28 days (44), 21 days (11), 24 days (1), 25 days (1), irregular (3). *Duration*—2 days (4), 3 days (23), 4 days (17), 5 days (9), 6 days (3), 7 days (2), unsteady (2). *Quantity*—moderate (25), free (14), scanty (13), variable (8). *N.B.*—In 5 patients the facts of menstruation were not taken.

*Occurrence of Previous Abortions and Premature Labours amongst Patients.*—Gestation had been previously interrupted prematurely in 9 patients: In 1 patient four times (all at eighth month), in 1 patient twice (at third month), and in remaining 7 patients once (2 at third month, 2 at fourth month, 1 at fifth month, 1 at sixth month, and 1 at seventh month).

*Some Statistics regarding the Present Pregnancies, Parturitions, and Puerperia of the 65 Patients admitted during the Quarter.*

I. PREGNANCIES—

i. *Periods of Stirrage and of Gestation as calculated from date of last Menstrual Discharge.*—In many (about 20) cases these were not known at all by the patients, or they were obscure.

*Dates of Stirrage* (according to patients).—Not known or obscure, 17. Known, 48: at 4th month, 15; 4½ month, 12; 3½ month, 6; 5th month, 5; 5½ month, 4; 3rd month, 3; 2½ month, 1; 6th month, 1; 7th month, 1.

*Duration of Gestation.*—Not known or obscure, 21. Of the remaining 44 gestations (about which the patients could give fairly definite information), some ended prematurely, as was indicated partly by the period which had elapsed since last menstruation, but chiefly by the poor dimensions and development of the newly-born child; some went on apparently to full time, although the child was by no means a full-term one, and in a few cases had been dead for some time; other gestations had apparently a short duration, as calculated from the date of the last menstruation, although the child was a full-term one. The actual number of days which elapsed between the onset (or cessation) of the last menstrual discharge and the occurrence of labour varied from 222 to 322:—Between 220 and 240 days, 5 cases; 240 and 260 days, 7 cases; 260 and 280 days, 18 cases; 280 and 300 days, 12 cases; 300 and 322 days, 2 cases.

ii. *The Circumference of the Abdomen, Direction, Position, and Length of the Uterus* at time of admission of patients.—In all but a few cases the patients were either threatened with the onset of labour or were in actual labour, so that the following statistics refer, perhaps, rather to the parturient than to the pregnant condition.

*Direction of Uterus.*—Strictly central in 32 cases, with right

obliquity in 12 cases, with left obliquity in 1 case. Direction not ascertained in other cases.

*Circumference of Abdomen at Umbilicus* varied from 30 to 40 inches. Average, 35 or 36 inches.

*Height of Fundus Uteri* (i.e., *Position of Uterus*).—Usually midway between umbilicus and xiphisternum, but in some cases (usually where labour had not begun) fundus uteri was at xiphisternum, and in other cases it was as low as one inch above the umbilicus.

*Length of Uterus* (as measured from upper border of symphysis pubis to fundus uteri) varied from 7½ to 11½ inches, being oftenest 9 or 10 inches.

iii. *Classification of Pregnancies.*—Fully 40 pregnancies were *natural.* The remaining (over 20) cases were complicated by one or more of the following *morbid* conditions :—(*a.*) *On the part of the Mother :* Leucorrhœa was common, and in 6 cases could be traced to neither gonorrhœa nor syphilis ; pediculosis, common ; 1 case of syphilis, with boils, leucorrhœa, otorrhœa ; 1 case of gonorrhœa ; 1 case of endometritis decidualis, ended at 6½ month ; 2 cases of morbid sickness of pregnancy, and 1 case of chronic gastric catarrh ; 2 cases of bronchitis ; 1 case of marked albuminuria, ended prematurely at eighth month ; 1 case of coma and convulsions (" eclampsia "), at eighth month, fatal to mother and child ; 2 cases of hysteria ; 1 case of strain and injury, ended prematurely at 7½ month by accidental hæmorrhage. (*b.*) *On the part of the Ovum :* 1 case of placenta prævia, ending by unavoidable hæmorrhage at full term, child dead-born ; 3 cases of syphilis of ovum, fœtuses dead and macerated, and exhibiting osteo-chondritis syphilitica.

II. Parturitions—

i. *Duration of Labours and of their Stages.—The duration of the first stage* in many cases was obscure, the patients stating that " lingering pains " had been present for one or two days, or even longer ; in definitely stated cases it varied from 1½ to 32½ hours, being most frequently about 12 or 15 hours. *The duration of the second stage* varied from 5 minutes to 5½ hours, being more frequently under than over 2 hours, and in individual cases was most often under 1 hour. *The duration of the third stage* varied from 5 minutes to 1¾ hours, the latter being cases in which the membranes were partially adherent and retained, and so had to be removed under chloroform ; most frequently the third stage lasted 20 to 25 minutes. *The duration of the whole labour* (dating from the appearance of the " shows " and pains) varied, in definitely stated cases, from 1¾ hours to 38¼ hours, both of these cases being in multiparæ ; in primiparæ it varied from 6 to 31½ hours, being most frequently from 11 to 19 hours.

ii. *The factors of Labour,* and the occurrence of any peculiarities or abnormalities in them.

(i.) *The Powers* were efficient in all but 3 cases, in all of which

the uterus was at fault from inertia, requiring in 2 of the cases the aid of the forceps.

(ii.) *The Passages:* 1. *Soft.*—The only peculiarity met with was an undue rigidity of the pelvic floor, especially on the part of the perineum; this occurred frequently, and nearly always in primiparæ; in 7 cases it delayed, or helped to delay, the labour. In a few cases it resulted in a sagittal tear of the perineum, but in most cases the perineum was saved in time by snipping the bases of the labia majora. 2. *Hard.*—The only peculiarity met with was an occasional small pelvis with a slightly narrowed brim, or a somewhat funnel-shaped pelvis with a narrowed outlet; but the peculiarity was never sufficiently marked to make the pelvis distinctly abnormal.

The following were the actual diameters:—Intertrochanteric diameter varied from 11 to 14 inches, most frequently 12 inches; intercristal diameter varied from 9¾ to 12 inches, most frequently 11 inches; interspinous diameter varied from 8½ to 10½ inches, most frequently 9½ inches. The inch of difference between the intercristal and interspinous diameters was usually fully preserved, there being more often 1½ inch of difference between them. External conjugate diameter varied from 7¼ to 9 inches, most frequently 8¼ inches; the diagonal conjugate diameter, where it could be ascertained, was only once less than 4½ inches.

(iii.) *The Passengers:* 1. *The Liquor Amnii* in nearly every case was moderate in quantity; in 3 cases it was somewhat scanty, and in 3 cases it was rather abundant, this being most marked in a case of albuminuria with premature labour at the eighth month.

2. *The Fœtus.—Number,* 66, there being 64 single births and 1 twin birth. *State at Birth.*—All alive except 5, which were born dead: 1 at seventh month, and 2 at eighth month—all macerated, and exhibiting evidence of syphilis; 1 at eighth month in case of "eclampsia," fœtus discoloured and beginning to peel; 1 at full term in case of placenta prævia, fœtus badly developed (like a 7½ month's), not peeling, had ascites (due to intra-uterine peritonitis), and malformed sexual organs. There were no still-born children. *Sex.*—Males, 38; females, 28. *Development.*—All were born at full term except 8, viz., 4 of those already mentioned as being born dead (3 at 8th month, and 1 at 7th month); 2 (twins) at 7½ month, of which 1 died a few hours after birth, while the other lived; 1 at 7½ month, poorly developed, lived only a few hours; and 1 at 6½ month, in a case of endometritis decidualis, lived only thirty-six hours after birth. *Length* varied from 14 inches (in 6½ month's fœtus) to 22 inches; amongst full-term children it varied from 17 to 22 inches, being most frequently between 18 and 20 inches. *Weight* varied from 2 lbs. (in 6½ month's fœtus) to 9 lbs. 3 oz.; amongst full-term children it varied from 5 lbs. to 9 lbs. 3 oz., being most frequently a little over 7 lbs. *Diameters and Circumferences of the Head (in Full-term Fœtuses).*—Occipito-mental diameter varied from 5 to 6 inches,

being most frequently 5½ inches; occipito-mental circumference varied from 14 to 16¾ inches, being most frequently 15 or 15½ inches; occipito-frontal diameter varied from 4¼ to 5 inches, being most frequently 4½ inches; occipito-frontal circumference varied from 13 to 15 inches, being most frequently 13½ or 14 inches; sub-occipito-bregmatic diameter varied from 3½ to 4¾ inches, being most frequently 4 inches; sub-occipito-bregmatic circumference varied from 11¾ to 13¾ inches, being most frequently 12 or 12½ inches; bi-parietal diameter varied from 3¼ to 4 inches, being most frequently 3½ inches; bi-temporal diameter varied from 2¾ to 3⅜ inches, being most frequently 3 inches.

3. *The Secundines:* (1.) *Umbilical Cord.—Length* varied from 15 to 44 inches, being most frequently below 20 inches. *Insertion into placenta* was nearly always sub-central; in 4 cases it was marginal, and 1 case central. *Torsion* was usually moderate; in 6 cases it was very marked (in these the cord varied in length from 17 to 44 inches); and in 3 cases very slight (in these the cord varied from 22 to 31½ inches). *Convolution* around child was usually absent; was present in 8 cases (in which the cord varied from 17 to 31½ inches), there being only one coil in 6 of the cases, and two coils in the other 2 cases. (2.) *Placenta.—Form* discoid in all cases except in 6,—4 battledore, 1 pyriform, and 1 ovoid. *Size.*—The diameter varied in full-term cases from 5 inches to 8 inches; most frequently it was 6½ or 7 inches. *Weight* varied from 1 lb. to 2 lbs. 8 oz.; was most frequently about 1½ lb. *Morbid Conditions.*—In 1 case it grew upon the lower uterine segment. In 4 cases it showed distinct signs of syphilis. In 1 case (of albuminuria) it was the seat of extensive hæmorrhages. In 1 case (of "eclampsia") it was the seat of one large and several small opaque, hard nodules. 3. *Membranes* were usually healthy; in a few cases they were unduly tough or unduly adherent. There was one distinct case of decidual endometritis.

iii. *Presentations and Positions during Labour* (66 births): 1. *Presentations.*—Cephalic, variety vertex, 62; variety sinciput, 1. Pelvic, variety breech, 1; variety knee, 1. Transverse, variety trunk, 1—total, 66. 2. *Positions.*—58 left anterior, 4 right posterior, and 4 right anterior. 3. *Presentations and Positions.*—Vertex, L.O.A., 56; vertex, R.O.A., 4; vertex, R.O.P., 2; sinciput, R.O.P., 1; breech, L.S.A., 1; knee, R.S.P., 1; trunk, L.Scap.A., 1.

iv. *Classification of Labours* (65 cases).

(*a.*) *Natural,* 44 cases.

(*b.*) *Laborious,* 13 cases, due to faults in the—*Powers,* 3 cases of inertia uteri; forceps required in 2 cases. *Passages:* α. *Soft*—3 cases of rigidity of the pelvic floor (especially the perineum), necessitating forceps. This condition was also present in 4 other laborious labours, but was not the chief cause of delay. β. *Hard*—1 case of funnel-shaped pelvis, with narrowed outlet and rigid perineum, necessitated forceps. *Passengers.*—1 case of excessively

tough membranes; 1 case of dead fœtus; 3 cases of large head of child, all needing forceps; 1 case of brow presentation (child also was dead). *N.B.*—Forceps (axis-traction) were used in 9 of these laborious labours, Nature sufficing in the other 4 cases.

(*c.*) *Præternatural.*—1 case of knee presentation.

(*d.*) *Complex*, 7 cases: *On the part of the Mother*, 6 cases, viz., 4 cases of rupture of the perineum, 1 case of unavoidable hæmorrhage, and 1 case of "eclampsia." *On the part of the Fœtus*, 1 case of twins.

III. PUERPERIA—

i. *State of the Temperature and Pulse.*—The temperature, except in a few cases noted below, was generally normal (98°·4 F.) The pulse, although in a few cases below normal (72) in the great majority of cases oscillated a few points above or below 80 per minute, this being higher than the ordinarily stated rate of the puerperal pulse. This was the usual pulse-rate during the puerperium in fully 50 of the patients, in whom nothing abnormal could be ascertained.

ii. *Classification of Puerperia.*—The puerperia were natural in practically 56 cases; in the remaining 9 cases some morbid condition arose on the part of the—

(i.) *Mother*, in 5 cases: 1 case of measles; patient was at once taken to the City Fever Hospital. 1 case of septic puerperal fever, with inflammation and suppuration of the right mamma, in a i.-para, aged 20, with otorrhœa, multiple boils, and evidences of secondary syphilis, ended in recovery. *N.B.*—In several other cases there was a rise of the temperature (but usually not of the pulse) during the puerperium; this could be traced in 2 cases to no distinct cause, but in the other cases to the expulsion of a small clot or scrap of membrane, a relic of the labour; the condition was remedied by the administration of antipyretics, or, if these failed, by one or two antiseptic intra-uterine douches. One case of suppurative eczema of genitals, perineum, and inside of thighs, of obscure origin; patient finally went to Professor Simpson's ward in the Royal Infirmary. One case of "eclampsia" (which had come on during pregnancy) ended fatally. One case of albuminuria ended in recovery.

(ii.) *Child*, 4 cases of death: 3 premature children (1 at 6½ month, 1 at 7½ month, and 1 twin at 7½ month) only lived a few hours after birth; 1 child died on the second day from atelectasis pulmonum.

## B. SOME SPECIAL CASES.

### (1.) *A Case of Deciduitis with Hæmorrhage during Pregnancy, and Onset of Labour at 6½ Month.*

Mrs A., iii.-para, æt. 28; previous obstetric history satisfactory. For the past year she had suffered from pain in the left iliac

region, constant, but aggravated during her periods. Seven months ago she had noticed in the same region a swelling. Up to one month ago she was menstruating regularly every three weeks, and not having felt stirrage, did not suspect pregnancy. During the last month patient had suffered from difficulty in micturition and from diarrhœa; the pain and swelling continued, the swelling appearing to get more central, and constant hæmorrhage set in, increased by micturition. Patient sought advice in Dr Halliday Croom's ward in the Royal Infirmary; while under observation she was seized with labour pains. She was at once taken in a cab to the Maternity Hospital, where she soon after admission gave birth to child and secundines during one pain. A portion of the membranes were adherent and retained in utero, and had to be removed under chloroform, owing to the pain in the left iliac region, in which was a tender, firm swelling (apparently cellulitic). The membranes were in a state of chronic thickening and inflammation. The uterus was douched out after the removal of the adherent membranes, and the mother made an uninterrupted recovery. The child was a 6½ month male, measuring 14 inches, and weighing 2 lbs. It was washed, wrapped up in wool, and put in the incubator, but it only lived for thirty-six hours.

(2.) *Case of Strain, followed by Hæmorrhage and Onset of Labour at 7½ Month.*

Mrs M., v.-para, æt. 35; previous obstetric history satisfactory. Menstruated last in May 1892; felt stirrage first in October 1892. During her pregnancy was considerably subject to cough and dyspepsia. On the 30th December 1892, while trying to lift a basketful of fish, she felt something give a "rack," and was not herself during the rest of the day. She continued going about her work, and next day "lingering pains" began, which were increased by some castor oil which she took for her bowels. At 2·30 A.M. on 1st January 1893 patient had a gush of blood and waters in bed. At noon on the same day she came into hospital; she was then in labour, the os being the size of a florin. In the evening she gave birth to a 7½ month male child, which was very cyanotic; it measured 15¾ inches, and weighed 3 lbs. 2 oz., and lived only a few hours after birth. On the maternal surface of the placenta was a recent blood-clot. The mother made an uninterrupted recovery.

(3.) *Case of Marked Albuminuria in Pregnancy, with Onset of Labour at the 8th Month; no Convulsions; Recovery.*

Mrs V., i.-para, æt. 20 years; sent in by Dr Fordyce and Dr Barbour. Patient had always been somewhat delicate; had measles and scarlatina in childhood, enteritis and pneumonia at 10, and

anæmia at 17. She menstruated last at middle of April 1892, and felt stirrage first in the following August. Pregnancy proceeded normally till the 5th month, when she began to get weak and unfit for work; at the 6th month she over-exerted herself, and nearly miscarried. At the end of the 6th month she noticed pain over the bladder during micturition. This disappeared; but at the 7th month she noticed that her eyelids and legs were swollen, and (on her attention being drawn to it) that her urine was less in quantity and thicker than usual. At the end of the 7th month, during the week before admission, she lost her appetite and got weaker, and had attacks of "depressed" headache, dimness of vision, and forgetfulness; fœtal movements also were feebler. Patient was admitted into hospital on the 12th December 1892, being in the first stage of labour (os the size of one shilling, vertex, L.O.A.) She was also œdematous over eyelids, ankles, and legs, and albuminuric. The urine (a specimen of which was removed from the bladder by catheter) was in following condition:—Pale amber, hazy, 1024, acid. Urea, 9 grs. per oz.; albumen very abundant. After adding Esbach's picric acid to the undiluted filtered urine in an Esbach tube, and letting tube stand for twenty-four hours, the deposit reached up to within one-eighth of an inch of the upper mark R. There were no blood, bile, sugar, pus, or tube-casts. The labour proceeded smoothly, half an ounce of glycerine being injected on two occasions between the lower uterine segment and bag of membranes to aid the first stage; the labour ended in twenty and a half hours. The child was an 8th month female, measuring 16 inches, and weighing 4 lbs. 2 oz.; it was alive, and during the puerperium was kept in the incubator at a temperature of 99° F. to 100° F., being applied every two hours for a brief interval to the mother's breast. It thrived well. The liquor amnii was abundant, almost amounting to a state of hydramnios. The cord and membranes were apparently healthy, but the placenta was the seat of very extensive hæmorrhages, varying in age from old yellow fibrous patches to more recent dark purple or red areas. During the puerperium the mother was put on renal diet; both the urea and the albumen diminished, there being usually about 5 grs. of urea and 1 gr. of albumen per ounce of urine. No convulsions ever occurred during the case.

(4.) *Case of "Eclampsia" at the 8th Month, with Artificial Induction of Labour by Glycerine Injections; Death of Mother and Child. (No Albuminuria during Life.)*

*N.B.*—This case, which forms a well-marked contrast to the preceding, has already been referred to by the President in his contribution on the use of Glycerine Injections as a means of inducing labour. To this paper the reader is referred for details.

Mrs H., i.-para, æt. 26, admitted into the hospital on 12th

November 1892 in a state of profound coma with occasional convulsions. From the patient's husband and mother were got the following facts:—Patient comes of healthy parents, though some of her brothers and sisters died of phthisis; one aunt was very hysterical, and another was insane; both aunts were on the father's side, and are now dead. Patient has always been nervous and excitable; she had measles and scarlatina in childhood, and occasionally during life (before and after marriage, which occurred fifteen months ago) has had brown scaly eruptions and winter sore throats; always has been a martyr to constipation. She lives in a comfortable home, and her habits as to food and drink are satisfactory. She menstruated last in beginning of April 1892, and felt stirrage first in June following. During pregnancy her constipation was very marked, and the active fœtal movements, after they began, were very distinct and uncomfortable, but at the end of October became very slight, and during the week before admission disappeared. From the end of October onwards patient suffered from thirst and severe headache, and on the 8th November was a short, sudden attack of vomiting, but no loss of vision or memory, or abnormality in the urine was noticed. On the 10th November patient had a violent rigor in bed during the early morning. On the 11th November patient had a free motion (the first for a week), but the headache became intense, being now distinctly right lateral and frontal, and at 5 P.M. ended in the first "fit," during which the patient became partially unconscious, showed the whites of her eyes, and was convulsed in the face and limbs. The husband states that he had noticed twitchings in the left side of the face during the previous few days. The doctor was sent for at once, and on arrival found the patient conscious, with a normal pulse and temperature, no indications of paralysis, and no albumen in the urine. During the night the patient had ten more "fits," and gradually become deeply comatose; during the fits, the doctor states that the eyes were strongly deviated to the left, the lips and nose moved irregularly in various directions, the lower jaw was clenched, and the upper and lower limbs were thrown into brief tonic, followed by clonic spasm; from the supervention of coma onwards the pupils remained contracted. During the night the doctor administered purgative and sedative (Potass. bromid.) enemata and hypodermic injections of morphine. Noticing that the administration of these remedies was often associated with the occurrence of a fit, the doctor began to keep the patient partially under the influence of chloroform from 4 A.M. onwards (on 12th November), the fits thereafter ceasing.

Professor Simpson was sent for, and on arrival advised that labour should be induced, and that the patient should be sent to the Maternity Hospital; and before leaving he injected (at 8·15 A.M.) between 3 and 4 ounces of glycerine through the undilated cervical canal into the lower uterine segment along its area of

attachment to the membranes. The patient was brought into the hospital at 10 A.M. on the 12th November 1892 in the comatose condition described. She was given a 1 in 30 boracic douche per vaginam, and soon after had her twelfth fit. A specimen of urine was drawn off with the catheter, and examined, with the following result:—Sp. gr. 1020, acid; urates very abundant (on cooling, the urine became rapidly turbid and opaque); urea 10 grains per ounce; sugar reactions faintly present (probably due to glycerine excreted); no albumen or blood or tube-casts. At 11 A.M. the os uteri had become dilated to the size of a shilling, and so one glycerine plug was introduced into lower uterine segment and cervical canal, and one into the roof of the vagina. At 1·40 P.M. the lower plug was removed, the os uteri being then about the same size as before. At 2·30 P.M. came the thirteenth fit, a very severe one, similar in nature to the preceding. At 4·20 P.M. the os uteri was the size of a florin, and 6 drachms of glycerine were introduced into the lower uterine segment. At 6·30 the "passive uterus" had become almost fully dilated, the fore-waters escaping gradually from this time onwards till 7·15 P.M., when the child was born. At 7·30 the placenta and membranes were expelled. The labour had progressed slowly but surely from onset to finish, occupying exactly eleven and a quarter hours. The child was an 8 month male, measuring 16½ inches, and weighing about 5 lbs.; it had been dead several days (probably about a week), there being a reddish-blue discoloration, especially over the abdomen, and some peeling of the cuticle from the penis and scrotum. The umbilical cord, which was 24 inches long, was coiled twice around the child's neck. The placenta measured 2½ by 4 inches, and weighed 13 oz.; it was ovoid in form, and presented one large and several small irregularly lobulated masses, opaque, white, and hard, and surrounded by somewhat thinned placental tissue. These masses, on microscopic examination, appeared to be old infarcts. At 10·50 P.M., three and a half hours after the labour, came the fourteenth fit, followed in less than half an hour by the fifteenth fit, during which the temperature rose to 100°·2 F., and the pulse to 116 beats per minute. From now onwards the temperature and pulse (which were taken hourly) were very irregular, the temperature varying much, though within small limits (97°·2 F. to 99°·4 F.), the pulse varying in rate from 62 to 114 beats per minute. Urine was drawn off from the bladder by catheter at intervals, and examined, with the same result as before. On the morning of 13th November the patient took her sixteenth fit (at 10·10 A.M.), and had her first free motion (at 11·35 A.M.) since admission. Patient then seemed to improve for a few hours, becoming semi-conscious and able to swallow. In the evening, however, she became worse, constantly threatening to take more fits (which were "aborted" by chloroform), the face and upper limbs constantly twitching, and the lower limbs being more or less in a state of tonic spasm.

During one of the abortive fits urine was passed in bed. The coma gradually became more profound, the temperature and pulse and breathing varying very irregularly from hour to hour; before midnight the right pupil became permanently dilated, and next morning at 4 A.M. the left pupil also became dilated, and just before 6 A.M. the patient died, on the 14th November 1892. An hour and a half after death, 50 c. c. of urine were drawn off from the bladder and examined, when for the first time were the reactions of blood and of albumen (copious) present, the urea also having meanwhile decreased.

The treatment adopted in the case had been,—Induction of premature labour by glycerine injections as described. Diet: milk by mouth when patient could swallow, otherwise nutrient enemata of extract of beef-juice. Control of the fits by chloroform, and by chloral and potassium bromide. A continuous appeal to the skin (by hot bottles) and to bowels (by repeated doses of croton oil or Henry's solution). The kidneys acted well throughout, keeping up a moderate supply of urine to the bladder, which was evacuated by the catheter at regular intervals. All vaginal douches used consisted of boracic lotion (1 in 20 or 30).

Specimens of the vomit, fæces, and of each day's urine were sent to Dr Noël Paton, and of the placenta to Dr J. Clarence Webster, to be examined at the Laboratory of the Royal College of Physicians, Edinburgh. The examination of the urine and placenta confirmed that already made.

Dr Robert Muir kindly performed the post-mortem examination, and made a macroscopic and microscopic examination of the patient's organs, which were in the following condition:—"*Skin* has a yellowish hue. *Lungs* congested, their apices presenting old fibrous and calcareous tubercles. *Heart* and *spleen* healthy. *Left ovary* has a corpus luteum of pregnancy. *Liver* pale yellow, in a state of marked fatty infiltration, and slight cloudy swelling. *Kidneys* in a state of cloudy swelling, going on to acute tubular nephritis. *Brain*—an extensive hæmorrhage is present, which has destroyed nearly the whole of the right frontal lobe and the greater part of the left frontal lobe in front; there is also blood beneath the arachnoid along the sulci of the parietal lobes, and a clot in the fourth ventricle; superficial veins of brain in pia-arachnoid are greatly distended with dark blood, which has formed fairly firm clots in many of them. (No evidence of syphilis in arteries of the brain.)" Dr Muir was of opinion that the bleeding had occurred from the superficial veins of both hemispheres, and quite possibly during the convulsions.

### (5.) *Case of Gonorrhœa.*

A. W., i.-para, æt. 18; single. Menstruated last at the end of February 1892, and felt stirrage first in the following July.

During her pregnancy she suffered from headaches, leucorrhœa, and burning pains during micturition. She sought treatment at the Edinburgh Royal Infirmary, whence she was transferred to the Maternity Hospital on the 8th of November 1893. On admission she had a well-marked gonorrhœal inflammation of the urethral, vaginal, and cervical canals, especially of the first and last; the gonococci were abundant in the leucorrhœal discharge. Fortunately, the patient was under treatment in the hospital for a month before the labour came off; by this time the gonorrhœa was in abeyance, and special precautions being taken during and after the delivery, no complication occurred on the part either of mother or child.

### (6.) *Case of Brow Presentation (Dead Fœtus).*

Mrs W., v.-para, æt. 24; admitted on 30th January 1893. Her four previous labours had all been easy, but each had ended at the 8th month in the birth of a dead child. She menstruated last in the middle of June, and felt stirrage first in October. During her present pregnancy she has suffered from general weakness and cough. On admission she is found to be a middle-sized, well-formed, and fairly well-nourished woman, with some bronchitis present, and the first stage of labour in progress. The pelvis is well-formed and roomy, the os uteri is the size of a shilling, and the fœtus, whose heart cannot be heard, lies with its back towards the mother's right side and back, and with its brow towards the left cotyloid cavity, the bregma presenting in the central pelvic axis. The labour proceeded slowly but surely, there being no special indication for interference, although delay might be said to be present. The first and second stages lasted slightly over twenty-seven and a half hours, the third stage only five minutes. The forehead presentation persisted throughout, the brow being born first, followed by the rest of the head, with the face next to the pubes. The child was a 7th to 8th month male (measuring 15 inches, and weighing 3½ lbs.), dead, and peeling, with some ascites and osteo-chondritis (syphilitic). The head was somewhat pyramidal in shape, with the blunted apex at the brow, on which was the caput succedaneum. The placenta was large, pale, and flabby, and also emarginate. The mother made an uninterrupted recovery.

### (7.) *Case of Knee Presentation.*

J. N., i.-para, æt. 30; single; admitted to the hospital on 9th January 1893; menstruated last during third week of April 1892; is a big, well-built, healthy woman. Abdomen very large (measuring 40 inches in girth at the umbilicus), and distinctly heart-shaped, owing to its upper broad end being divided by mesial groove running down from the xiphisternum. Fœtal heart-sounds

were distinctly audible on both sides of the mesial line, so that at first the case seemed to be one of twins. The heart-sounds, however, had the same frequency, and could be traced continuously across the middle line. The pelvis was large and roomy, and on admission of the patient the os uteri had not begun to dilate, and the presentation could not be distinctly made out. Four hours after admission, however, the os was fully dilated, and the bag of membranes burst, the first stage being thus very rapid. It was then ascertained that the child was lying in the right posterior position, with the right knee presenting—a rare condition. By manipulation the right knee was pushed up and the right foot brought down; the left foot was firmly planted with its sole against the inner aspect of the right thigh, and could not be brought down, and so matters were left to Nature. In time the right lower limb and both buttocks were born beyond the vulva, but the left lower limb was doubled up, the left foot being jammed in the fork of the fœtus, with the toes visible at the vulva. Even at this point the left foot could not be got to descend, and progress threatened to cease, when the labia were snipped through with scissors close to the fourchette to relieve the perineum. This at once allowed the left foot and lower limb and trunk to descend and escape. The right upper limb was now found to have passed up by the side of the head (which at this stage could be very distinctly felt per abdomen lying to the right side, the placenta lying to the left side higher up); the right upper limb was brought down in the usual way, and was born along with the left one. As the cord was now beating slowly, the head was extracted by the combined Smellie-Prague grasp. The placenta followed in thirteen minutes, and was very large; it was discoid in form, measured 7½ by 8 inches in diameter, and weighed 2 lbs. 6 oz. The infant was a large full-term living female, with a very loose skin, due apparently to an excess of subcutaneous tissue; it measured 21½ inches, and weighed 9 lbs. 3 oz.; its head was large and unusually broad, the bi-parietal diameter being 4 inches, and the bi-temporal diameter 3⅜ inches. The circumference of the right knee below the flexure was 6 inches, that of the left knee at the corresponding place was 5¼ inches. Mother and child progressed well during the puerperium.

### (8.) *Case of Central Placenta Prævia.*

Mrs P., iv.-para, æt. 27; admitted to the hospital on the 10th December 1892. Her first labour required forceps, owing to the child being large and the mother's pelvis being small; second and third labours natural; one abortion at 3rd month nearly two years ago. Patient was suckling her last child (which was born in January of the present year, 1892) when she again became pregnant; there was no re-establishment of menstruation, but stirrage was felt in July. Her pregnancy proceeded without incident until the

middle of November, when there was a slight bloody discharge, which, however, ceased, and seemed too trivial for attention. On the 1st of December came a second discharge of blood, amounting, however, to "two breakfastcupfuls," and causing the patient some alarm. On the 10th December came a third discharge of blood, amounting to about "three breakfastcupfuls." She sent at once to the Maternity Hospital, and the students who were despatched to her, as they could elicit no history of accident, and thought they could feel placental tissue, plugged the vagina with antiseptic wool, and brought the patient into the hospital on the 10th of December 1892, as already stated. On admission the abdominal swelling was rounded in form, reaching up to midway between the umbilicus and xiphisternum; uterine contractions and bleeding had apparently ceased; the os uteri was multiparous, and admitted one finger, and through it could be felt placental tissue, which, however, was somewhat difficult to recognise at first from the breech of the child, which at this period was the presenting part; fœtal heart-sounds were loudest above and to the left of the umbilicus. The mother's pelvis was well formed but small, the diameters being,—Intertrochant., 11 inches; intercrist., 10 inches; interspin., 9 inches; ext. conjug., 7¼ inches; and diagon. conjug., 4¼ inches. The patient was kept at absolute rest, and given a dose of tincture of opium, no distinct bleeding or uterine contractions being present. This condition of affairs continued on till the next day (11th December), when, however, it was noticed that a very slight but constant oozing of blood was taking place, necessitating the changing of the wool tissue at the vulva thrice in twenty-four hours. The same condition continued on during the 12th of December, and on during the 13th also, the quantity of blood lost being very slight, but the oozing never really ceasing. So at 4·30 P.M. on the afternoon of the 13th December Dr Barbour introduced a small Barnes's bag, the medium one twenty minutes later, and the large one three hours later. A hot vaginal douche had just been given preparatory to the extraction of the child, when the strong uterine contraction induced by the douche caused the bag to be shot out on to the floor, a considerable quantity of blood escaping. Dr Barbour at once applied his left hand firmly over the uterus, and carrying his right hand into the vagina and through the placenta, grasped the legs of the child (which was now lying transversely), and proceeded to extract it by traction and compression, the bleeding being thereby checked for the time. During the extraction of the child there was some difficulty in getting the abdomen through the brim and cervix, the head, however, passing quite easily; this was afterwards seen to be due to a certain morbid condition in the child, to be mentioned presently. The child and placenta and membranes were extracted together at 8·45 P.M. The ensuing hæmorrhage was very profuse, but was checked by firm abdominal compression, and by hot vaginal douching continued for

ten minutes, and then followed by firm plugging of the vagina with a long strip of iodoform gauze, the uterus being kept firmly pressed against the plug in the vagina by the left hand upon the abdomen. The bleeding area was thus completely controlled, the plug was left in during the night, and the uterus carefully watched; but the bleeding, after being once checked, never recurred. Ergotin also was injected to aid in keeping the uterus contracted. Next morning the plug was removed; the bleeding had just been sufficient to moderately stain it. The mother made an uninterrupted recovery, and was able to leave the hospital eleven days after delivery.

The infant at birth was dead, having died during the separation of the placenta; it measured 14 inches, and weighed 3 lbs. 5 oz.; it had ascites, which caused the abdomen to have a larger circumference than the head. The external genitals resembled those of a male, but on closer examination the apparent penis and scrotum turned out to be an œdematous clitoris and undivided labia (*i.e.*, no vulva). The apparent anus was in reality a cloaca; in front of this was a minute orifice, the meatus urinarius. On opening the abdomen there were exposed the internal generative organs of the female, the uterus being bicornuate, and the ascites was seen to be due to peritonitis.

### (9.) *Case of Twins.*

M. T., ii.-para, æt. 21; single. The first child presented by the breech in the L.S.A. position, and had to be artificially extracted; it was a male, measuring 14½ inches, and weighing 2 lbs. 8 oz.; it was very feeble, and died a few hours after birth. The second child presented by the vertex in the L.O.A. position, and was born naturally; it was also a male, measuring 16½ inches, and weighing 3 lbs. 1 oz.; it was feeble also, but was reared in the incubator, and fed with a spoon as it could not suck; it survived, and on leaving the hospital was thriving slightly. The mother left the hospital after a normal puerperium. The twins were binovular, and born at about the 7½ month.

### (10.) *Case of Septic Puerperal Fever, with Right Mastitis; Recovery.*

J. L., i.-para, æt. 20; single; admitted on 14th January 1893. Patient menstruated last in middle of April 1892, and felt stirrage first in the following September. During her pregnancy she had poor health, suffering from dyspepsia, otorrhœa (the relic of an attack of scarlatina twelve years ago), successive crops of multiple boils over the body (some of which were lanced), leucorrhœa, and several of the signs of secondary syphilis. The labour was natural, and was conducted with the customary antiseptic precautions, which were strictly enforced owing to the complications present. Notwithstanding, the patient took septic fever on the third day of the puerperium, probably having been previously inoculated by her own

morbid discharges from the right ear and genital passages. After three days' severe struggle, the fever was overcome by very vigorous intra-uterine douching. Meanwhile, however, the right mamma became inflamed, and notwithstanding treatment, went on to suppuration, and had to be opened. It healed in about ten days, and patient and child left the hospital in fairly good health.

*Intern Mortality:* (*a.*) *Maternal*—1 death, from "eclampsia." (*b.*) *Fœtal*—9 deaths; 5 fœtuses were dead when born, as already mentioned; 4 infants died shortly after birth, 3 from prematurity (1 at 6½ month, in the case of deciduitis; 1 at 7½ month, in the case of accidental hæmorrhage; and 1 at the 7½ month, viz., the first child in the case of twins); these only lived for a few hours; 1 full-term child, from atelectasis pulmonum, died on the second day.

## Extern Practice.

*Number of Cases*, 141: Primiparæ, 27; multiparæ, 114 (ii.-paræ 13; iii.-paræ, 12; iv.-paræ, 21; v.-paræ, 16; vi.-paræ, 7; vii.-paræ, 12; viii.-paræ, 11; ix.-paræ, 6; x.-paræ, 3; xi.-paræ, 4; xii.-paræ, 6; xiii.-para, 3).

*Age of Patients* varied from 17 to 45 years—below 20 years, 9 patients; between 20 and 30 years (inclusive), 73 patients; between 31 and 40 years (inclusive), 46 patients; above 40 years, 9 patients; ages not ascertained in 4 patients.

*Occurrence of Abortions*, 3 in number; 1 at the 6th week; 1 at the 6th month, child presenting by the vertex, and being born dead along with the placenta, female, peeling; 1 at the 6th month, child presenting by one foot, born dead, and peeling, male. *N.B.*—In the two last cases there was present syphilitic osteo-chondritis at lower end of femur.

*Occurrence of Premature Births*, 5 in number: 1 at 7th month, vertex, L.O.A., male, dead, syphilitic; 1 at 7th month, breech, L.S.A., male, dead and peeling, syphilitic; 1 at 7th month, vertex, L.O.A., male, born alive, died twelve hours after; 1 at 7½ month, vertex, L.O.A., female, dead and peeling, syphilitic; 1 at 7½ month, transverse, left arm, L.Scap.A., female, dead and peeling, syphilitic.

### *Classification of Labours.*

I. NATURAL, 116 cases. These include 1 of the births at 7½ month, 2 of the births at the 7th month, and 1 of the births at the 6th month, just referred to. The other births were at or near full term.

II. LABORIOUS, 8 cases, due to faults in—

i. *Powers:* 1 case of inertia uteri, vertex, L.O.A.; a living female child was delivered with forceps. In a few other cases the powers were slightly inefficient, but not sufficiently so to be the essential cause of the delay.

ii. *Passages:* 1 case of funnel-shaped pelvis with a narrowed outlet (also some inertia uteri), vertex, L.O.A.; a living male was delivered with forceps. One case of justo-minor pelvis, vertex, L.O.A.; a living male was delivered with forceps.

iii. *Passengers:* 1 case of large size of child (especially head), vertex, L.O.A., living female, delivered with forceps; 1 case of large size of child (also deficient powers), vertex, L.O.A., living male, delivered with forceps; 1 case of large size of child (also small pelvis), vertex, R.O.A., living male, delivered with forceps; 1 case of malposition of head, viz., persistent occipito-posterior, vertex, R.O.P., a living male, delivered with forceps, perineum uninjured; 1 case of mal-presentation of head, viz., face case, face, R.M.P., a living male, was born after some delay without aid of forceps. *N.B.*—Forceps (axis-traction) were thus used in 7 of the 8 laborious labours.

III. PRÆTERNATURAL, 5 cases, all pelvic presentations of the breech variety: 1 case of breech presentation, L.S.A., resulted in birth of a living female; 1 case of breech presentation, L.S.A., male, still-born, could not be resuscitated by students in attendance; 1 case of breech presentation, L.S.A., male, still-born, could not be resuscitated by students in attendance; 1 case of breech presentation, L.S.A., male, born prematurely at 7th month, dead and peeling (syphilitic); 1 case of breech presentation, R.S.A., resulted in birth of a living female. *N.B.*—There was also a case of abortion at 6th month in a x.-para, aged 25 years; fœtus presented by one foot, and was a male, dead and peeling (syphilitic).

IV. COMPLEX, 10 cases. Complication was on the part of the—

i. *Mother*, in 4 cases: 1 case of hæmorrhage in the third stage, due to retention of the placenta in utero from inertia, occurred in an xi.-para, aged 35; a few days before labour the mother had a fall. The child presented by the vertex in the L.O.A. position, and was a male and alive. The placenta was removed by Credé's method, and showed on the maternal surface a large, partially-organized clot; mother recovered well. One case of slight post-partum hæmorrhage in a vii.-para, aged 35, vertex, L.O.A., male, alive; the bleeding was checked in the usual way, and the mother made a good recovery. One case of post-partum hæmorrhage in a iv.-para, aged 25, vertex, L.O.A., female, alive; bleeding checked; mother recovered. One case of slight sagittal laceration of the perineum in a i.-para, aged 19, vertex, L.O.A., a living male with a large head; perineum was stitched with two carbolized chromic catgut sutures, and healed.

ii. *Child*, in 6 cases: 1 case of prolapsus funis in a i.-para, aged 24; child presented by the breech in the L.S.A. position. The cord was noticed to be prolapsed when the membranes ruptured, being protruded at the vulva; could not be replaced by the

students in attendance. On the arrival of the house-surgeon the cord had just ceased beating; a female child was extracted as speedily as possible, but was still-born, and could not be resuscitated. There was also slight post-partum hæmorrhage, which was checked in the usual way; mother recovered. One case of prolapsus funis in a vii.-para, aged 30, of very small stature, and with scoliosis of spine and ankylosis of the right hip-joint. The labour was premature, at 7½ month; fœtus was presenting transversely in the L.Scap.A. position, the left upper limb, right foot, and cord all being prolapsed into the vagina. The cord was pulseless, the child dead, and peeling (probably syphilitic, as afterwards proved). On the arrival of the house-surgeon the fœtus was firmly impacted transversely in the small and deformed pelvis, and could not be turned. Decapitation was attempted with a blunt hook, but failed; it was then partially accomplished by means of a piece of thin cord (previously soaked in corrosive sublimate lotion), when the child was born by "spontaneous evolution," the body being born doubled up, and then followed by the head; mother made a good recovery. One case of prolapsus funis in a i.-para, aged 25, single, and mentally deficient; the pelvis was a justo-minor, with an external conjugate diameter of 7 inches; interspinous diameter, 9 inches; and intercristal diameter, 10 inches. The student in attendance on his arrival found the cord prolapsed and pulsating, the child presenting by the vertex in the L.O.A. position, and the pelvis uniformly contracted, as just mentioned. He tried to replace the cord, but failed, and so sent for the house-surgeon; on arrival of the latter the cord had entirely ceased beating; high forceps were applied, but could not move the head. As the second stage had already been over five hours in duration, and as there seemed to be an imminent danger of rupture of the uterus, it was decided to at once proceed to break up the head with any suitable instrument at hand. Accordingly, the patient being still kept under chloroform, and the forceps being left *in situ* grasping the head, the vault was perforated with a pair of closed scissors, which were then opened as widely as possible in various directions, so as to break up the calvarium. Strong traction was then made with the forceps, when a considerable quantity of brain tissue was expressed through the hole in the vault. The student then relieved the house-surgeon at the forceps, and unfortunately, while he was exerting traction, the head came down upon the perineum and tore it sagitally back into the anal canal. Considerable difficulty was also experienced in extracting the body of the child, which was a large full-term female. After birth of the placenta, the uterus and vagina were at once thoroughly douched. Owing to the squalid and miserable surroundings of the patient (who was somewhat collapsed), she was removed in a cab, and admitted to Professor Simpson's ward in the Royal Infirmary, where she remained several months, and finally had her perineum repaired.

One case of twins, in a ii.-paræ, aged 36; the twins both presented by the vertex, and were born alive and healthy; females; there were two placentæ, that of the second child was retained in the uterus by its hour-glass contraction, and was safely removed under chloroform; mother made a good recovery. One case of twins, in a iv.-para, aged 27, resulted fatally to both children and to mother, this being the only maternal death in the Extern practice of the hospital during the quarter. Both twins were males. The first twin presented by the vertex in the R.O.P. position, had to be delivered with forceps, and died four days after birth. The second twin presented transversely in the R.Scap.A. position, with a prolapsed, pulseless cord; it was impacted, and could not be turned, and so had to be decapitated before birth was possible. After the delivery of a common placenta (into which the two cords were inserted some 3 inches apart), the uterus and vagina were douched carefully. The mother unfortunately took septic puerperal fever, and despite all efforts, died on the seventh day of the puerperium. One case of monster birth, viz., an anencephalic fœtus, in a v.-para, aged 32, face presentation; a dead anencephalic female; hæmorrhage occurred during and after the third stage, but was checked; mother made a good recovery.

*Presentations and Positions.*—There were 141 labours, including an abortion at the 6th week, and 2 twin cases, *i.e.*, 142 births.

i. *Presentations.*—Cephalic, 133 cases: Vertex, 131; Face, 2 (one of these being an anencephalic monster). Pelvic, 7 cases: Breech, 6; Footling, 1. Transverse, 2 cases: Shoulder, 1; Arm, 1.

ii. *Positions.*—Left anterior, 134; Right anterior, 4; Right posterior, 4.

iii. *Presentations and Positions.*—Vertex, L.O.A., 127; Vertex, R.O.A., 2; Vertex, R.O.P., 2 (one of these being a twin); Face, R.M.P., 2 (one of these being a monster); Breech, L.S.A., 5; Breech, R.S.A., 1; Footling, L.Scap.A., 1; Shoulder, R.S.A., 1; Arm, L.Scap.A., 1.

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*Extern Mortality.*—(*a.*) *Maternal*, 1 death (from septic puerperal fever). (*b.*) *Fœtal*, 16 deaths: 9 were dead at birth, being premature and syphilitic usually; 5 were still-born, viz., 2 breech cases, 3 cases of prolapse of cord (one being a twin); 2 died a few hours after birth from prematurity.

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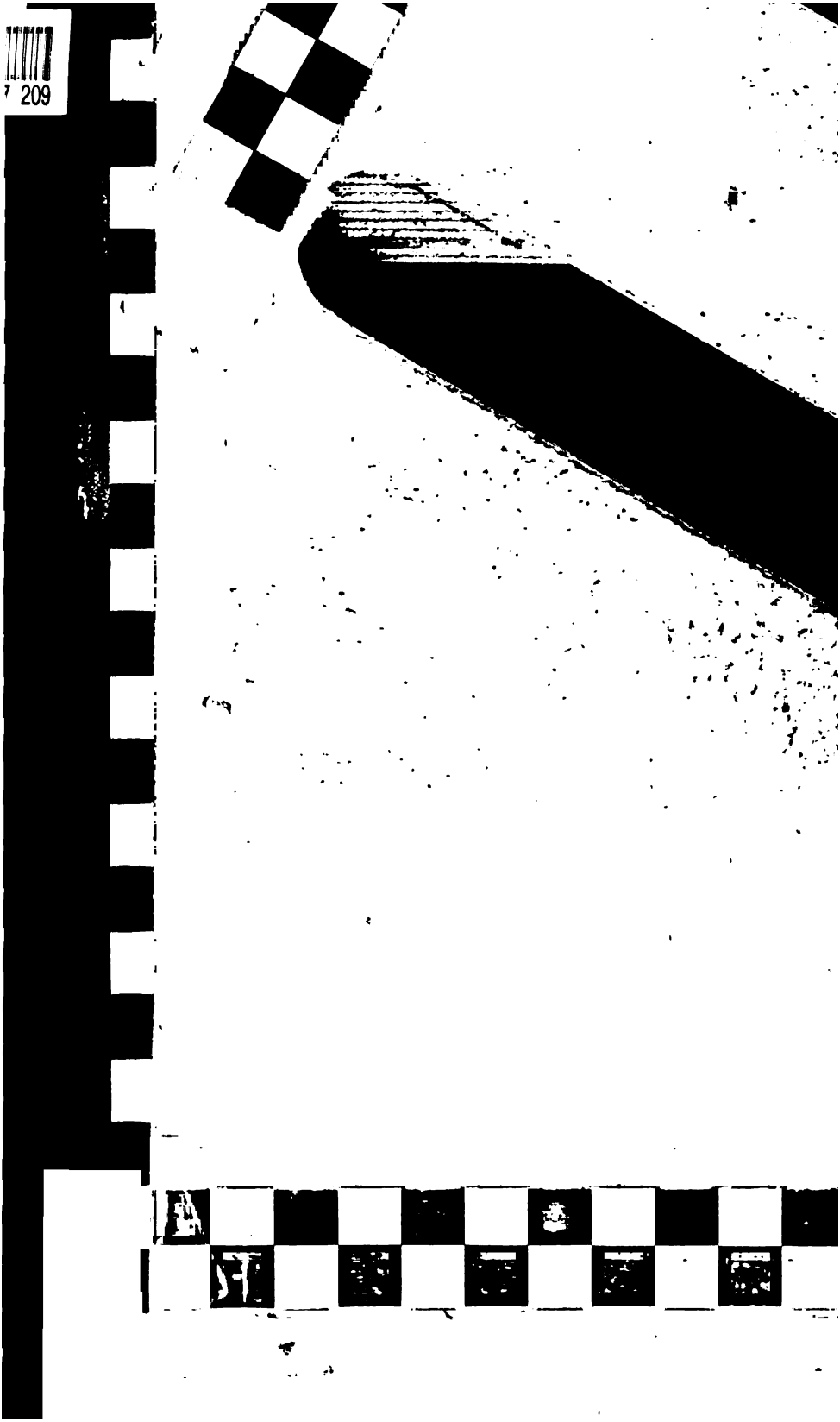
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